ML-7000 Series

ML-7000P
ML-7000N
QwikLaser 7000
QwikLaser 7000P
QwikLaser 7000N

SERVICE Manual

Laser printer

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   (Network Printer Card)

SERVICE MANUAL ML-7000

SAMSUNG ELECTRONICS

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1. Precautions

1-1 Safety precautions

Read each caution carefully

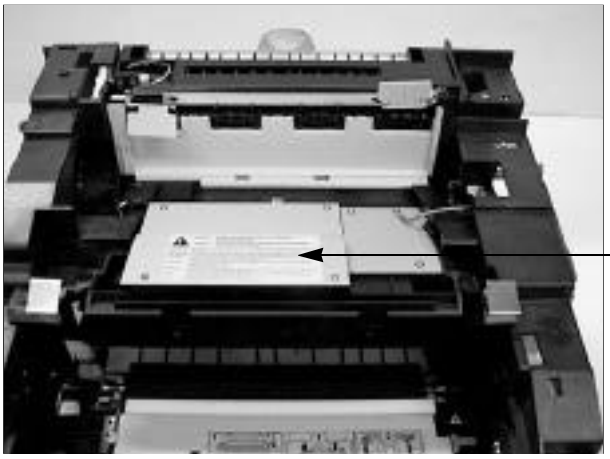
1. Do not use the pinter near water or when exposed to inclement weather.
2. Do not place this printer on an unstable cart, stand or table, the product may fall, causing serious damage to the product.
3. Slots and openings on the cabinet are provided for ventilation. To ensure reliable operation and to protect the printer from overheation, do not block or cover any of these openings. Do not place the printer in an enclosure unless the enclosure providesadequate ventilation.
4. Never push any kind of objects into the printer through the cabinet ventilaition slots as they may touch dangerous hihg voltage points, create short circuits, cause a fire, or produce an electrical shock. Never spill any kind of liquid on the printer.
5. Do not place the printer in a lacation where someone may trip on the cord.
6. Select a work surface that is lartge enough to hold the printer.
7. Operate this printer using the power source (110V, 220V, etc) indicated on the marking label. If you are not sure of the type of power source available, consult your dealer or local power company.
8. If you need to use an extension power cord with this printer, make sure that is uses a three-wire grounded cord and that the total ampere ratings for all of the products using the extension, do not exceed the extension cord ampere ration.
9. Do not allow anything to rest on th power cord or data communications cable.
10. Unplug this printer from the wall outlet before cleaning. Do not use liquid cleaners or aerosol sprays. Use a damp cloth for cleaning.
11. Do not touch the surface of the photo-sensitive drum as marks ro scratches may impair print quality.
12. Do not expose the drum unit to direct light for prolonged periods.
13. Use only standard papers, OHP films and approved envelopes.

1-2 Laser Safety Statement

The printer is certified in the U.S to conform to the requirement of DHHS 21CFR Subchapter J for Class I(1) laser product, and elsewhere is certified as a class I laser product conforming to the requirement of IEC 825.

Class I laser product are not considered to be hazardous. The laser system and printer are designed so there is never any human assess to laser radiation above a Class I level during normal operation, user maintenance, or prescribed service condition

Caution : Never operate and service the printer with the protective cover removed from Laser Scanner Assembly. The reflective beam, although invisible, can damage your eyes



CAUTION - INVISIBLE LASER RADIATION WHEN THIS COVER OPEN.
DO NOT OPEN COVER
VORSICHT- UNSICHTBARE SASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET.
NICHT DEM STRAHL AUSSETZEN.

ATTENTION - RAYONNEMENT LASER INVISIBLE EN CAS D'OUVERTURE, EXPOSITION DANGEREUSE AU FAISCEAU.
ATTENZIONE - RADIAZIONE LASER INVISIBLE IN CASO DI APETURA, EVITARE L'ESPOSIZIONE AL FASCIO.
PRECAUCION - RADIACION LASER IVISIBLE CUANDO SE ABRE, EVITAR EXPONERSE ALRAYO.
ADVARSEL - USTNLIG LASERSTRÄLNING VED ÄBNING, NÄR SIKKERHEDSBRYDERE ER UDE AF FUNKTION, UNDGÄ UDSAETTELSE FOR STRÄLNING.
ADVARSEL - USYNLIG LASERSTRÄLNING NÄR DEKSEL ÄPNES, STIRR IKKE INN I STRÄLEN, UNNGÄ EKSPONERING FOR STRALEN.
VARNING -OSYNLIG LASERSTRÄLNING NÄR DENNA DELÄR ÖPPNADOCH SPÄRREN ÄR URKOPPLAD, BETRAKTA EJ STRÄLEN, STRÄLEN ÄR FARLIG.
VARO! - AVATTAESSA JA SUOJALUKITUS OHITEETTAESSA OLET ALTTINA NÄKYMÄTTÖMÄLLE LASER SÄTELYLLE ÄLÄ KATSO SÄTEESEEN.
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LSU caution label is located on the LSU top side

CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL A LASER DE CLASSE 1
TO IEC 825

2. Reference Information

2-1 Abbreviations and Acronyms

Tables 2-1 and 2-2 List abbreviations and acronyms which may be found in this sevice manual.

Table 2-1. Abbreviations

Abbv	Definition	Abbv	Definition
amps	amperes	lb	pound(s)
		lin	linearity
ass'y	assembly	lock	bus lock
badac	bad assess	mm	millimeter(s)
		neg	negative
bps	bits per second	od	open drain
clk	clock	OSC	oscillator
cm	centimeter(s)	OUT	output
CON	connector	PIC	picture
GND	ground	pos	positive or position
HLDA	hold acknowledge	pot	potential
HLDAR	hold acknowledge received	psynrq	page synchronizaton request
HLDR	hold request	pwr	power
HOR	horizontal	qty	quantity
in	inch(es) or input	sw	switch
INTA	interrupt Acknowledge	sync	synchronous or
			synchronization
INT	Interrupt	tach	tachometer
INTR	Interrupt request	Vcc	collector supply valtage(dc)
I/O	Input and Output	vert	vertical
mpx	multiplex	Vp-p	peak-to-peak voltage
		VR	variable resistor

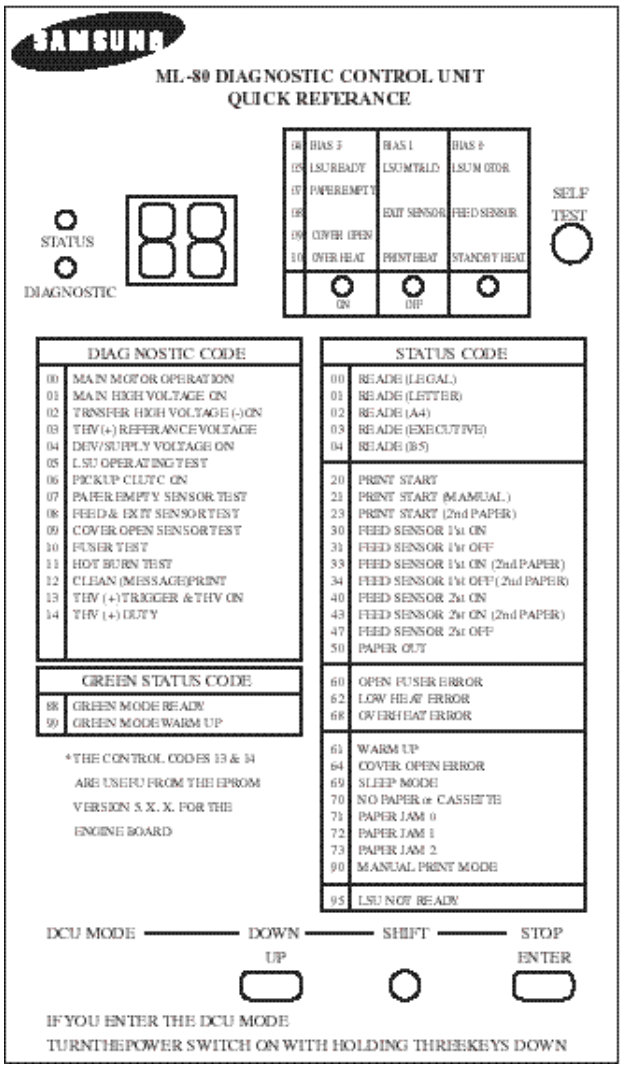
Table 2-2. Acronyms

Acronym	Definition	Acronym	Definition
ABL	Automatic Blanking Limiter	IDE	Intelligent Drive electronics or Imbedded Drive Electronics
ACC	Automatic Color Control	IF	Intermediate Frequency
ADC	Analog to Digital Converter	IPM	Images Per Minute
ADS	Address/Data Status	ISA	Industry Standard Architecture
ALE	Address-Latch Enable	KBC	Keyboard Controller
ASCII	American Standard Code for Information interchange	LAD	Local Address/Data Bus
BIOS	Basic Input/Output System	LCD	Liquid Crystal Display
BPF	Band Pass Second	LED	Light Emitting Diode
BPS	Bits Per Second	MCA	Micro Channel Architecture
CCFT	Cold Cathode Fluorescent Tube	MDA	Monochrome Display Adapter
CGA	Color Graphics Adapter	NC	No Connection
CMOS	Complementary Metal Oxide Semiconductor	NF	Noise Fiqure or Noise Factor
CPU	Central Processing Unit	PA	Power Amplifier
CRT	Cathode Ray Tube	PBA	Printed Board Assembly
CRU	Customer Replacement Unit		
DMA	Direct Memory Access or Dynamic Memory Address	PBM	Primary Bus master
DMAC	Direct Memory Access Controller	PCB	Printd Circuit Board
DVM	Digital Voltmeter	PCMCIA	Personal Computer Memory Card International Association
EEPROM	Electronically Erasable Pro-grammable read Only Memory	PLCC	Plastic Leaded Chip Carrier
EGA	Enhanced Graphics Adapter	PMS	Power Management System
EISA	Extended Industry Standard Architecture	POST	Power On Self Test
ESDI	Enhanced Small Device Interface	PPM	Pages Per Minute
FDC	Floppy Disk Controller	PQFP	Plastic Quad Flat Package
FDD	Floppy Disk Drive	QFP	Quad Flat Package
FL	Fluorescent Light(Lamp)	RAM	Random Access Memory
HDD	Hard Disk Drive	ROM	Read Only Memory
HPF	High Pass Filter	RTC	Real-Time Clock
SCSI	Small Computer Systems Interface	SBM	Secondary Bus Master
SIO	Serial Input/Output Controller	TSTN	Triple Super Twisted Nematic
SOP	Small Outline Package	UHF	Ultrahigh Frequency
SSOP	Shrink Small Outline Package	VCO	Voltage Controlled Oscillator
STN	Super Twisted Nematic	VESA	Video Electronics Standard Association
SCC	Serial Communications Controller	VGA	Video Graphics Array
TFT	Thin Film Transistor	VHF	Very High Frequency
TS	Tri-State	XO	Crystal Oscillator
TSOP	Thin Small Outline Package		

2-2. Diagnostic Control Unit

2-2-1. Abstract

The diagnostic Control Unit(DCU) is useful for troubleshooting the Laser beam printer ML Series engines, and for checking printer status.
The DCU can be used in common for ML series, but each model has several different code description.
Refer to the code description for ML-7000 in next page.



< Fig 1-1. ML-80 DCU >

2-2-2. List of code description

Code Description			
1. DIAGNOSTIC CODE		**2.STATUS CODE**	
00	MAIN MOTOR OPERATING	78	SYSTEM ERROR
01	MAIN HIGH VOLT ON / OFF TEST	00	Ready to print from LEGAL paper tray
02	THV (-) ON / OFF TEST	01	Ready to print form LETTER paper tray
03	THV (+) ON / OFF TEST	02	Ready to print form A4 paper tray
04	DEV, SUPPLY ON / OFF TEST	03	Ready to print form EXEC paper tray
05	LSU OPERATING TEST	04	Ready to print from B5 paper tray
06	PICK UP CLUTCH ON	05	Ready to print from FOLIO paper tray
07	PE, DS1, DS2 SENSOR TEST	20	PRINT START (1st CASSETTE)
08	MP, EXIT, FEED SENSOR TEST	21	PRINT START (MULTI PURPOSE)
09	TOP & REAR COVER OPEN,	22	PRINT START (2'nd CASSETTE)
	OUT BIN SENSOR TEST	23	PRINT START (DUPLEX)
10	FUSER TEST	50	PAPER OUT
11	HOT BURN TEST	60	OPEN FUSER ERROR
12	DUPLEX CLUTCH TEST	62	LOW HEATER ERROR
13	MULTI PURPOSE CLUTCH TEST	68	OVER HESTER ERROR
14	THERMISTER 2 TEST	61	WARM-UP
15	PAPER SIZE SENSOR TEST	64	COVER OPEN ERROR
		69	SLEEP MODE
		70	NO PAPER or CASSETTE
		71	PAPER JAM "0"
		72	PAPER JAM "1"
		73	PAPER JAM "2"
		74	DUPLEX JAM "1"
		75	DUPLEX JAM "2"
		76	OUT BIN FULL
		95	LSU NOT READY

2-2-3. The Diagnostic Control Unit (DCU) Operating Guide

The DCU has functions as follows:

1) Engine Status and Error Code Display mode

¶ Display the engine status and error status code. Refer to List of Code Description.

2) Self-Test mode.

¶ When the engine is ready, this button starts printing a streak pattern.

3) Green mode

¶ Transfer high Voltage adjustment mode
With the power off, hold down the Self-Test button and turn on the pinter. Continue holding down the button for 5 seconds to start Green mode.

4) Diagnostic Control mode.

¶ With the power off, hold down the 3 button (up/down, shift, stop/enter) and turn on the printer
Continue holding down the button for 5 seconds to start Diagnostic Control mode on the engine.

¶ The DCU has three diagnostic control buttons.

UP : Steps the function of the other two buttons:

SHIFT : Controls the function of the other two buttons:
SHIFT+UP means step down and SHIFT+START means stop.

START : Stasrts or stops the current diagnostic test.

Code	Key	Operation	LED Display
00	ENTER	Run Main Motor	Lighten ON LED
	SHIFT+STOP	Stop Main Motor	Lighten OFF LED
	UP	Increment DCU Code No. (01, MHV)	
	SHIFT+DOWN	Decrement DCU code No. (13, MP)	
01	ENTER	MHV ON	Lighten ON LED
	SHIFT+STOP	MHV OFF	Lighten OFF LED
	UP	Increment DCU Code No. (02, THV Negative)	
	SHIFT+DOWN	Decrement DCU code No. (00, Main Motor)	
02	ENTER	THV Negative ON	Lighten ON LED
	SHIFT+STOP	THV Negative OFF	Lighten OFF LED
	UP	Increment DCU Code No. (03, THV)	
	SHIFT+DOWN	Decrement DCU code No. (02, MHV)	
03	ENTER	THV ON	Lighten ON LED
	SHIFT+STOP	THV OFF	Lighten OFF LED
	UP	Increment DCU Code No. (04, Dev)	
	SHIFT+DOWN	Decrement DCU code No. (02, THV Negative)	
04	ENTER	DEV, SUPPLY ON	Lighten ON LED
	SHIFT+STOP	DEV, SUPPLY ON	Lighten OFF LED
	UP	Increment DCU Code No. (05, LSU)	
	SHIFT+DOWN	Decrement DCU code No. (03, THV)	
05	ENTER	LSU Motor On	Lighten 3rd LED
	UP	LSU Leady and LD On	Lighten 1, 2nd LED
	SHIFT+STOP	LSU Motor OFF	
	UP	Increment DCU Code No. (06, Pickup Clutch)	
	SHIFT+DOWN	Decrement DCU code No. (04, Dev)	

Code	Key	Operation	LED Display
06	ENTER	Pickup Clutch ON	Lighten ON LED
	SHIFT+STOP	Pickup Clutch OFF	Lighten OFF LED
	UP	Increment DCU Code No. (07, Sensor TEST)	
	SHIFT+DOWN	Decrement DCU code No. (06, Pickup Clutch)	
07	No Action	Paper Empty Sensor ON/OFF	1st LED ON/OFF
	No Action	Duplex 1 Sensor ON/OFF	2nd LED ON/OFF
	No Action	Duplex 2 Sensor ON/OFF	3rd LED ON/OFF
	UP	Increment DCU Code No. (08, Sensor TEST)	
	SHIFT+DOWN	Decrement DCU Code No. (06, Pickup Clutch)	
08	No Action	Multi Purpose Sensor ON/OFF	1st LED ON/OFF
	No Action	Exit Sensor ON/OFF	2nd LED ON/OFF
	No Action	Feed Sensor ON/OFF	3rd LED ON/OFF
	UP	Increment DCU Code No. (09, Sensor TEST)	
	SHIFT+DOWN	Decrement DCU Code No. (07, Sensor TEST)	
09	No Action	Cover Open Sensor ON/OFF	1st LED ON/OFF
	No Action	Cover Open Sensor ON/OFF	2nd LED ON/OFF
	No Action	Out Bin Sensor ON/OFF	3rd LED ON/OFF
	UP	Increment DCU Code No. (10, Fuser TEST)	
	SHIFT+DOWN	Decrement DCU Code No. (08, Sensor Clutch)	
10	ENTER	Fuser ON	Lighten ON LED
	SHIFT+STOP	Fuser OFF	Lighten OFF LED
	UP	Increment DCU Code No. (04, Dev)	
	SHIFT+DOWN	Decrement DCU code No. (02, THV Negative)	
12	ENTER	Duplex Clutch ON	Lighten ON LED
	SHIFT+STOP	Duplex Clutch OFF	Lighten OFF LED
	UP	Increment DCU Code No. (13, MP Cluth)	
	SHIFT+DOWN	Decrement DCU code No. (11, Self-Test)	
13	ENTER	Multi Purpose Clutch ON	Lighten ON LED
	SHIFT+STOP	Multi Purpose Clutch OFF	Lighten OFF LED
	UP	Increment DCU Code No. (14,Thermister 2 Test)	
	SHIFT+DOWN	Decrement DCU code No. (12, Duplex Clutch)	
14	No Action	Temperature ß 15 °	1st LED ON Z
	No Action	15 ° ¶ Temperature ¶ 30 °	2nd LED ON Z
	No Action	Temperature ß 30 °	3nd LED ON [
	No Action	Thermister 2 Open	All LED ON
	No Action	Thermister 2 Short	All LED OFF
	UP	Increment DCU code No. (15, Cassette sensor TEST)	
	SHIFT + DOWN	Decrement DCU Code No. (13, MP Clutch TEST)	
15	No Action	Cassette Sensor 1 ON/OFF	1st LED ON/OFF
	No Action	Cassette Sensor 2 ON/OFF	2nd LED ON/OFF
	No Action	Cassette Sensor 3 ON/OFF	3nd LED ON/OFF
	UP	Increment DCU Code No. (00, Main Motor)	
	SHIFT + DOWN	Decrement DCU Code No. (14, Thermister 2 Test)	

3. Product Information

● Engine Specifiation

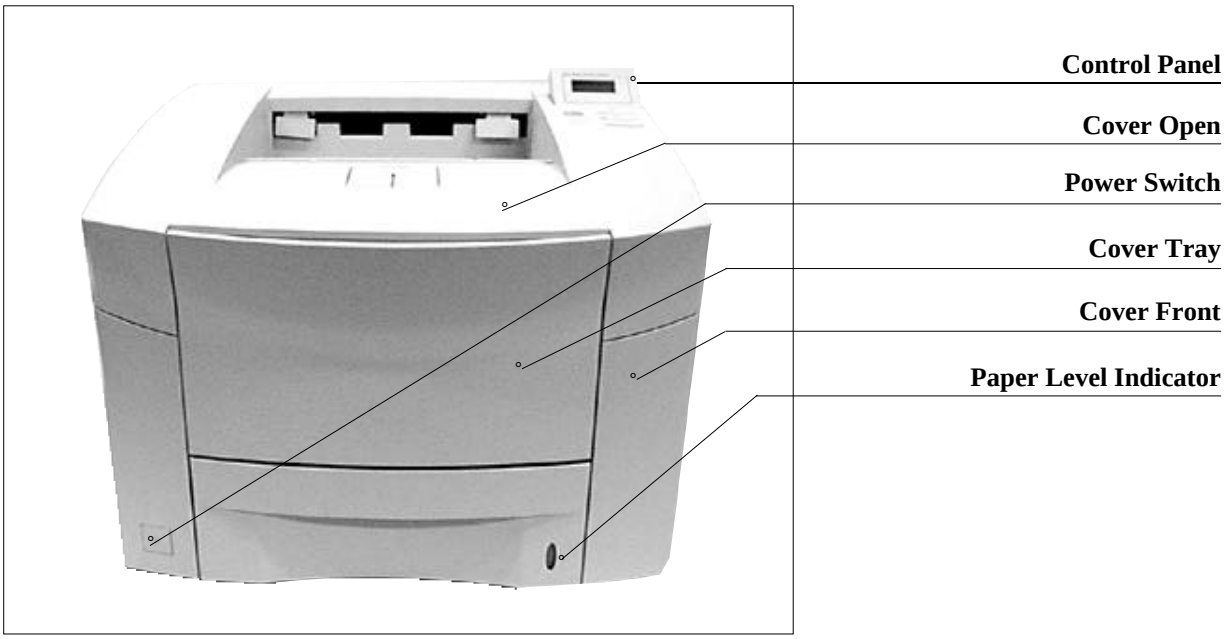
Item		Descriptions	Remarks
Engine	Speed	17 PPM	Letter
	Resolution	600 DPI +RET	
	Imaging	Eletrophotography	
	Toning/Fusing	Non-mag monocomponent/contact	
	WarmUp time	Less than 60 secs	N/N condition
	FPOT	Less than 13 secs	standby mode
	Duty Cycle	Maximum 50,000 pages per month	
	Size(WDH)	427 ° 442 ° 301mm	
	Weight	Less than 16.5Kg (36.4lb)	not packaged
	Power Consumption	340W Avg/ 34W Sleep	
	Noise Level	Printing : ° 50dB Standby : ° 36dB Sleep : Background noise	 Blow Fan off
Paper Handling	Input Capacity	500 sheets	Universal
	Optional Input	500 sheets (40 envelopes)	
	Output Capacity	250 sheets Facedown	No faceup mode
	MP Tray	100 sheets (10 envelopes)	
	Envelop Feeder	supported by Multi-Purpose tray, optional cassette	
	Type of Media	° Cassette : A4, LTR, FO, LEG, EXE, ISO B5 ° MP Tray : Legal~A6, OHP, LABEL COM-10, MON, DL, C5, C6 ° Optional Cassette : A4, LTR, FO, LEG COM-10, MONARCH, DL, C5	
	Duplexing	Paper : A4, LTR, FO, LEG	
	Paper Sensor	Yes	
Imaging Catridge	CRU type	Single cartridge Replacement	
	CRU Life	8,000 pages at 5% coverage	
	Cleaning System	Mechanical Cleaning	
	Charging/Transfer	Contact Charging & Transfer	
	Toner Sensor	Yes	
	Toner saving	Yes	
Others	Control Panel	° 8 ° 2 LCD ° LCD Display angle adjusting ° Backlighting	
	Paper Level Indicator	Visible Mechanism	
	Power Switch	Front & Left side, Push botton	

● Controller Specification

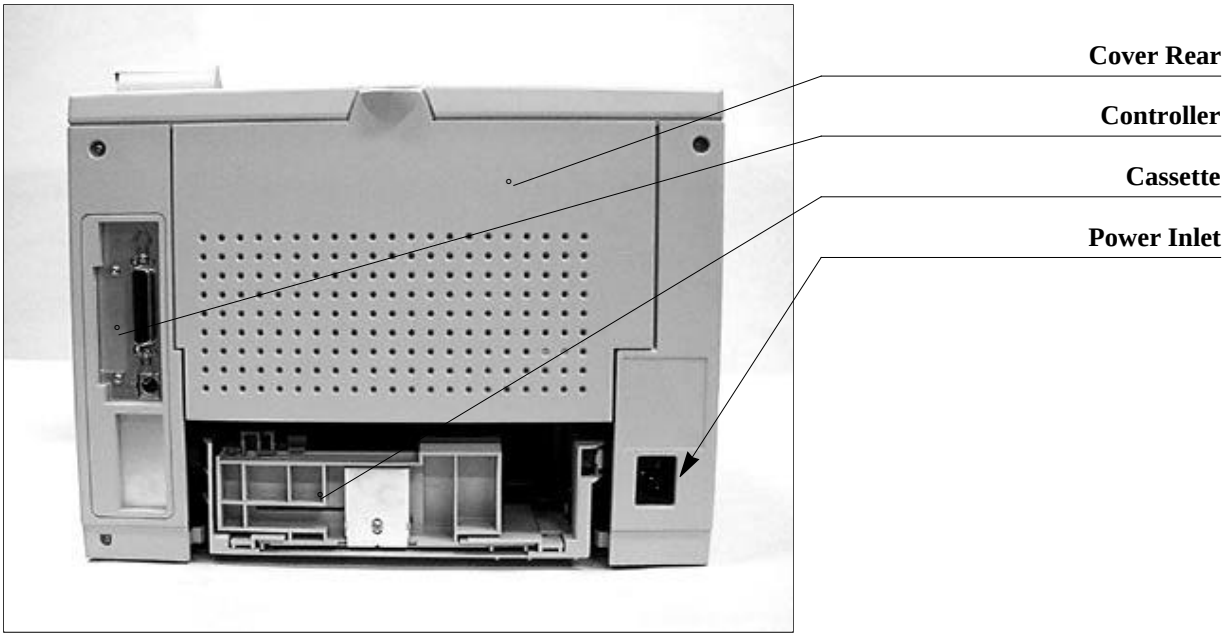
Item		Descriptions	Remarks
Controller	CPU	Power PC, 100MHZ	
	Emulation	° Default : PCL6 ° Option : Postscript Level 2	
	Memory	° 4MB Standard ° Max up to 68MB ° Speed : 60nS ° DRAM Module's Features ° Refresh Time : 2048 Cycles/32mS ° Fast Page Mode with Extended data out ° CAS-before-RAS refresh capability ° TTL compatible inputs and outputs ° Single +5V ° 10% power supply	
		° 2, 4MB Flash memory option ° Postscript : 12MB Standart	P.S Simm Module
	Interface	° IEEE 1284 B type Option : Serial RS 232C InfraRed Adaptor connector Local Talk, Internal Network	
	AIS/AES	Y/Y	
	Font	35 Intellifont, 10 True Type, 1Bit Map	
	Port Thru (Network Printer Card)	° Ethernet ° 10 base T ° SNMP in MIB ° TCP/IP ° Netware, Windows, OS/2, Unix, Mac	TCP/IP, SPX/IPX Apple Talk, NetBEUI/NetBios
	Device Driver	PCL : Windows 3.1/95/NT, DOS	

4. Disassembly

4-1 Front View

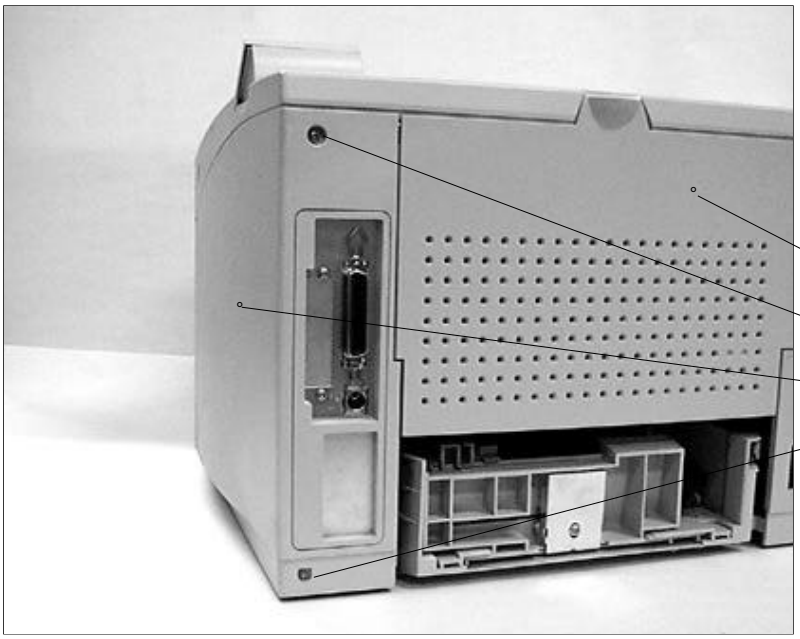


4-2 Rear View

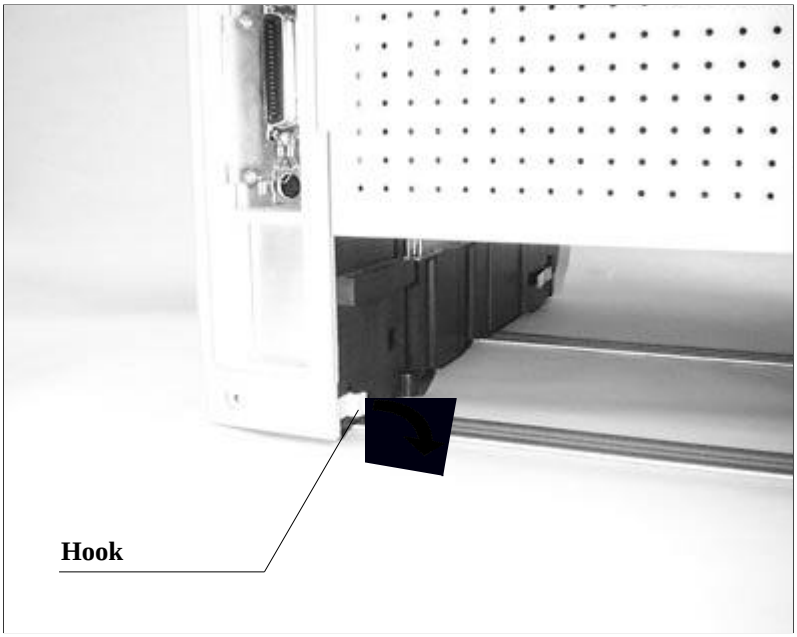


4-3 Cabinet Disassembly

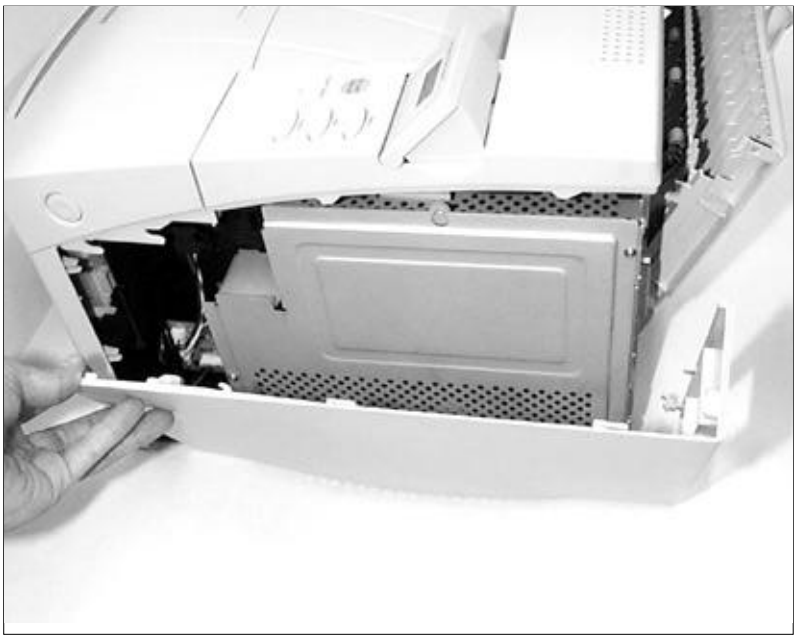
4-3-1. Cover Right



Remove the screws and open the Cover Rear.

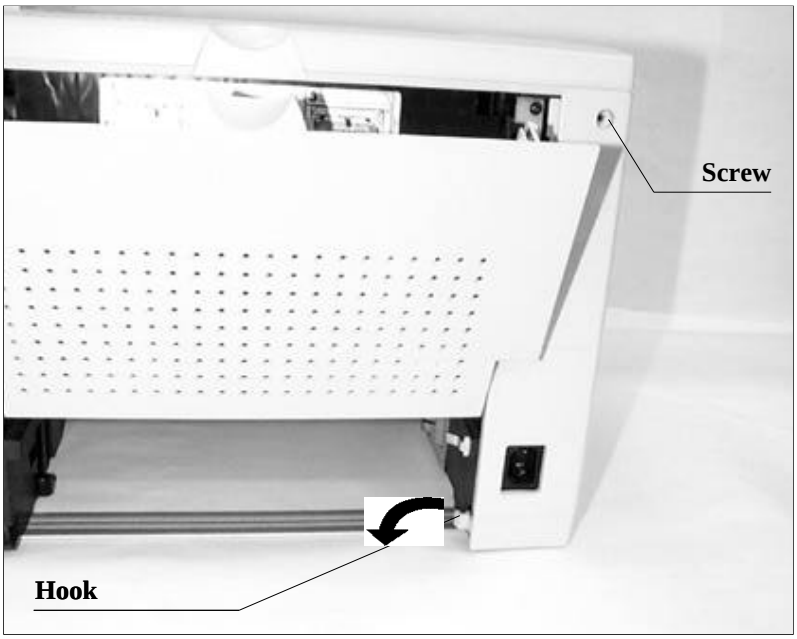


In order to remove the Cover Right. Please see the hook which locks the cabinet to the frame, right hand should first grab the hook and pull it out for releasing the hook from the frame.



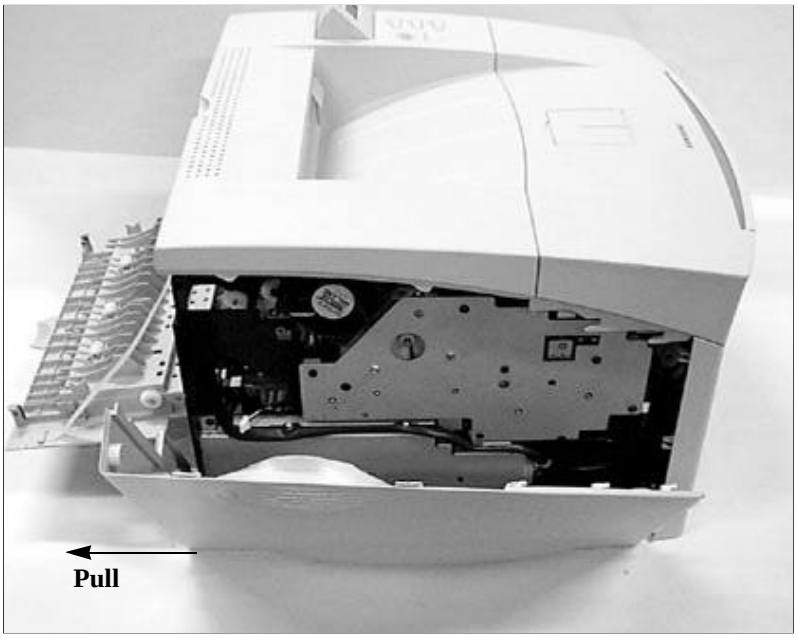
The left hand should slide the Cover Right to the backward.

4-3-2. Cover Left



Remove screw and open the Cover Rear.

Please see the hook of the Cover Left. Pull the Hook and release it from the frame.



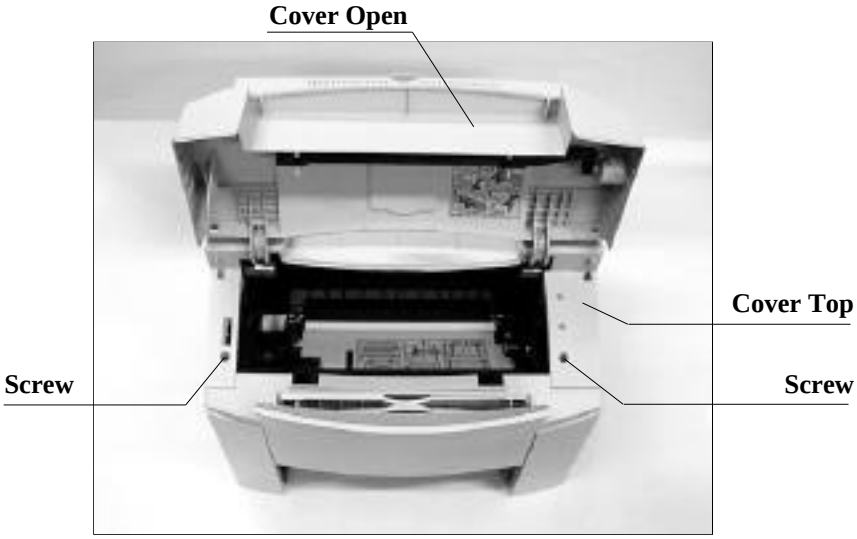
Slide the Cover Left to the backward with pulling the hook out.

The Cover Left can be easily removed.

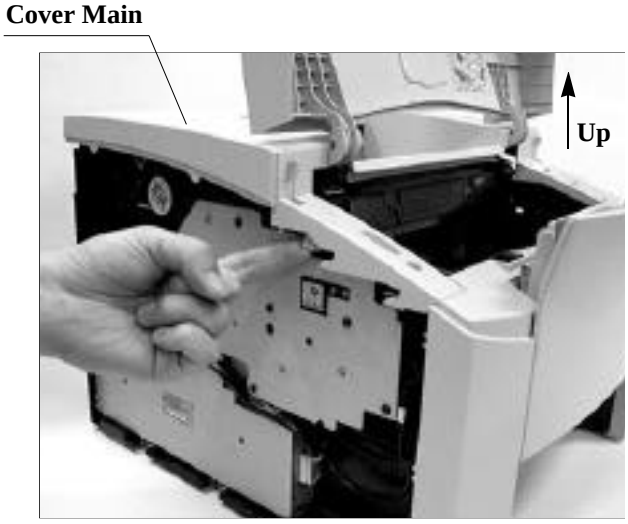
4-3-3. Cover Front

Please see the MP tray disassembly. (4-9)

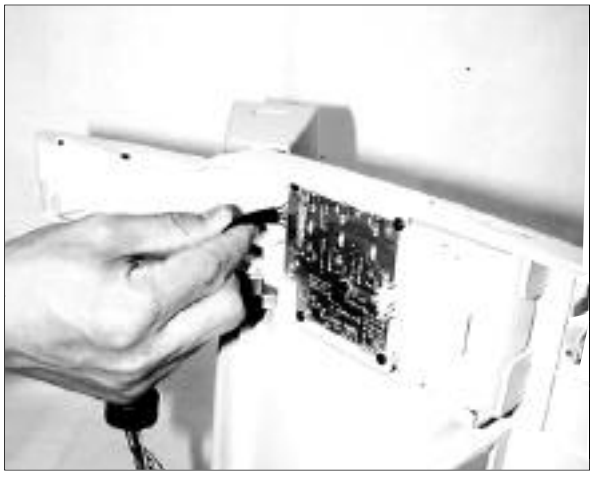
4-3-4. Cover Main



Open the Cover Open.
Remove two screws.

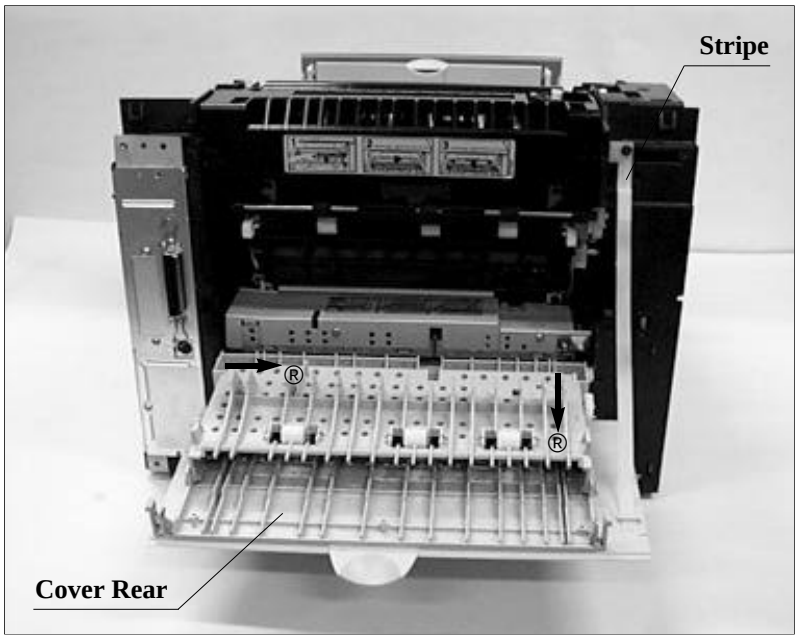


See the hooks.
Push the hooks up and pull them upward.

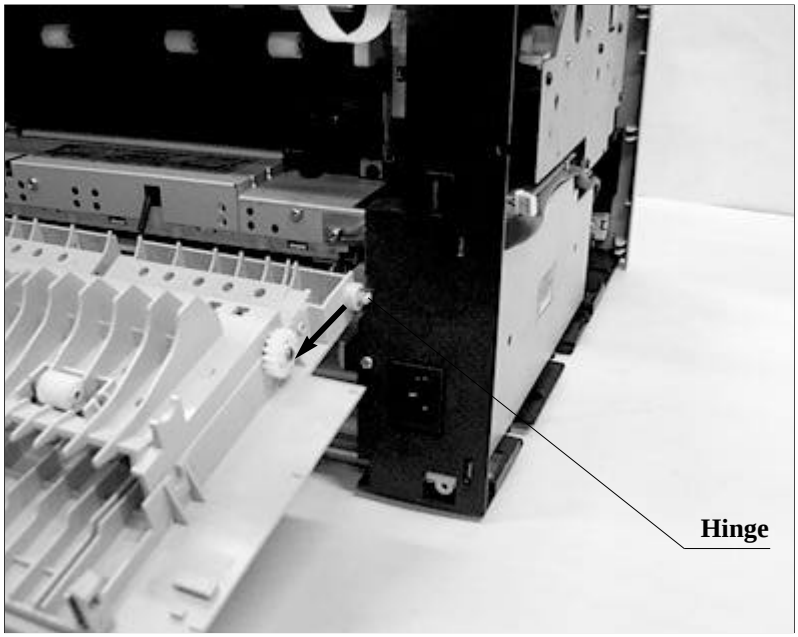


With holding Cover Main, remove the panel wire.

4-3-5. Cover Rear

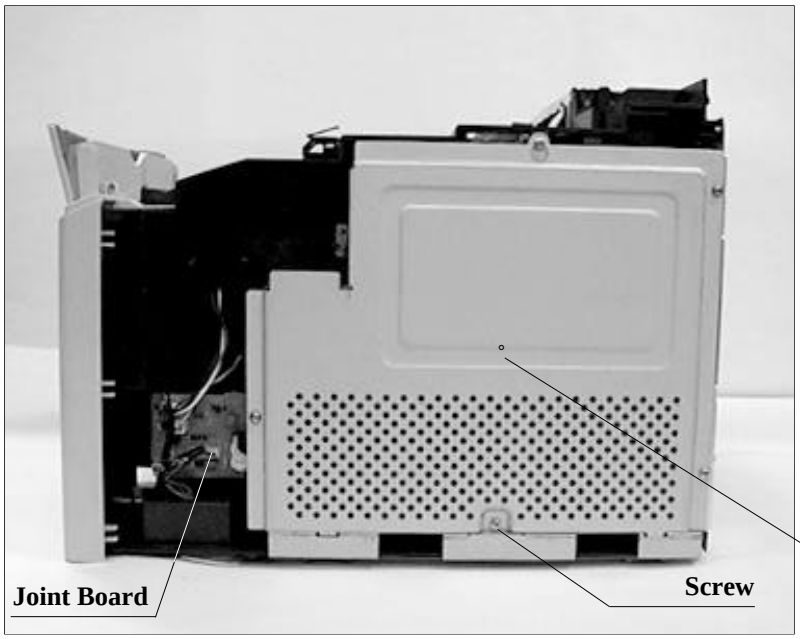


Open the Cover Rear.
Detach the stripe by pushing the stripe.
There is a hook holding the stripe.

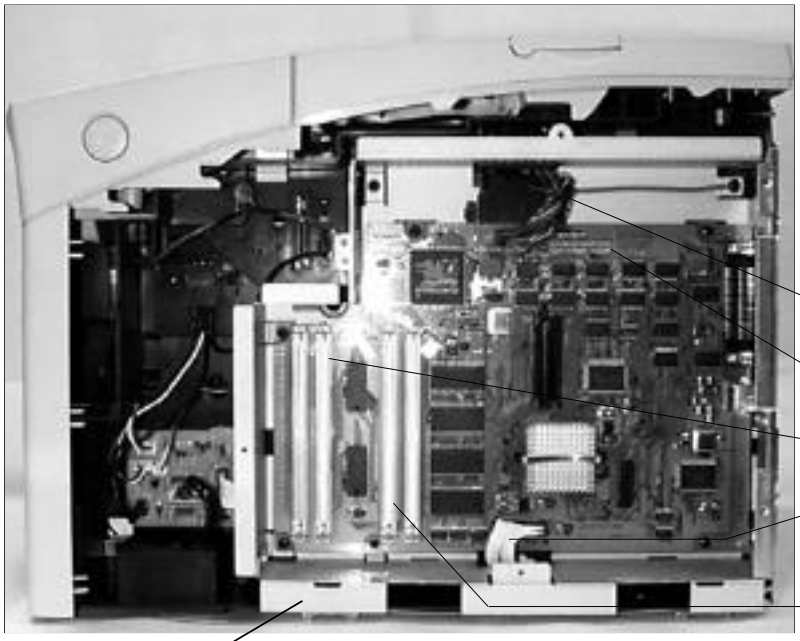


After detaching the stripe from the Cover Rear,
Release the Cover Rear from the hinge.

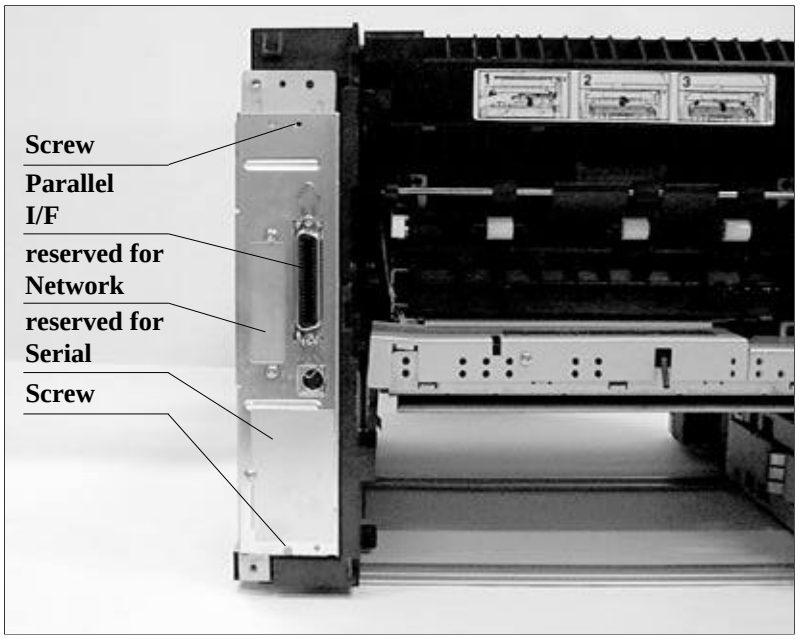
4-4 Video Controller board & Joint board



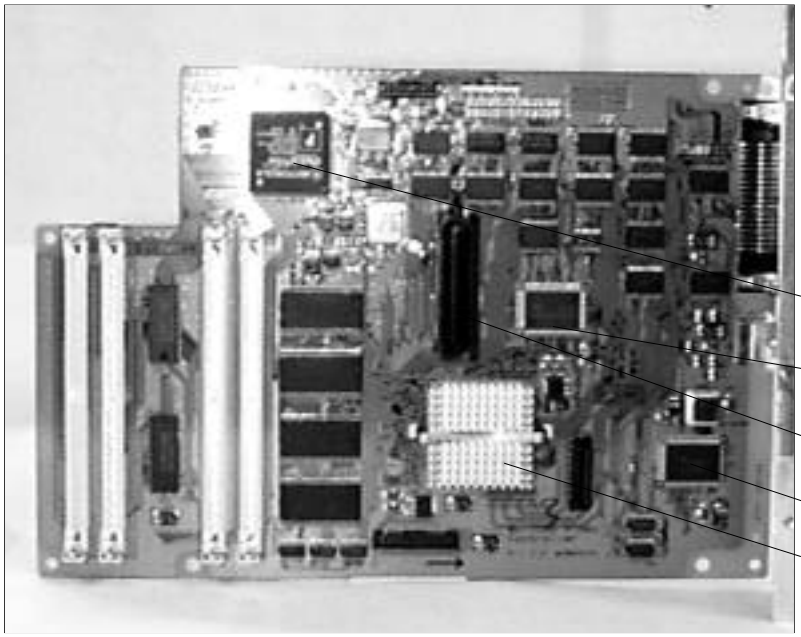
After removing external cabinet, see the 5 screws and you should remove them.
The Shield ICU is important for EMI and protection for Controller.



After removing Shield ICU, you can see the assembled controller.
Unplug the panel cable and engine I/F cable with care and remove the screws from the frame.

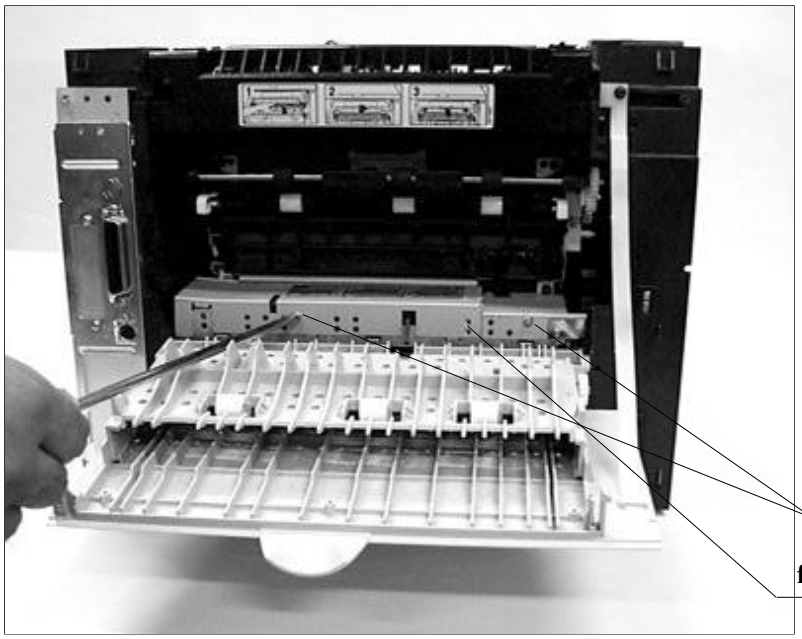


Remove the screws which hold the Bracket ICU to the frame and detach controller from the frame.
You can see the Frame ICU.

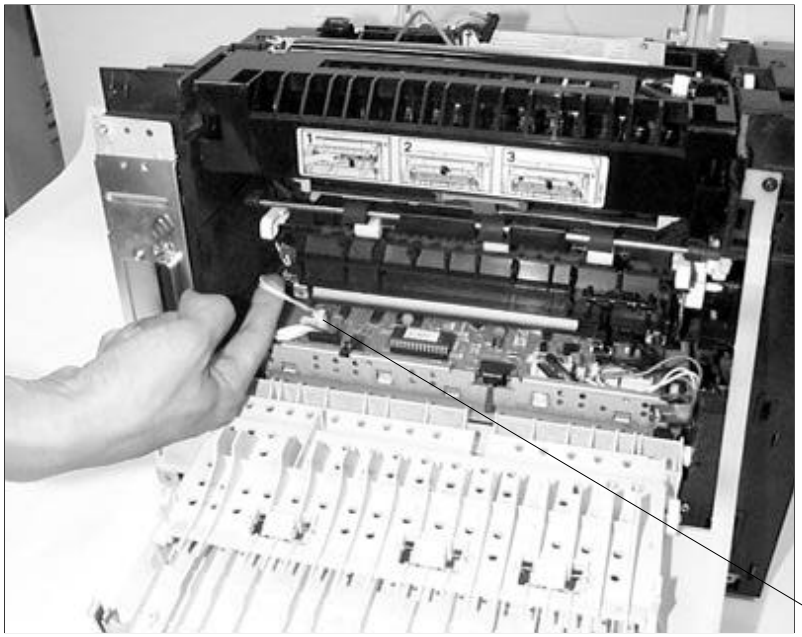


Video Controller Board

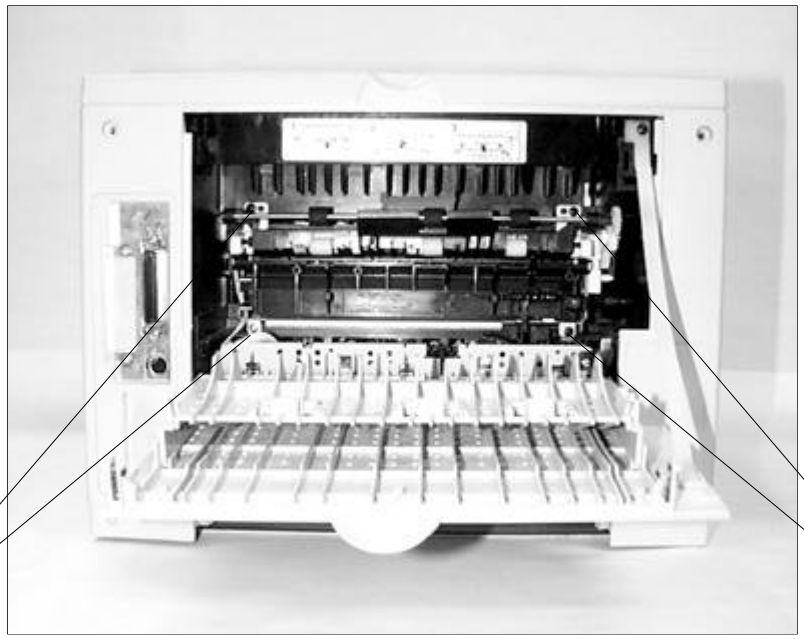
4-5 Fuser Ass'y



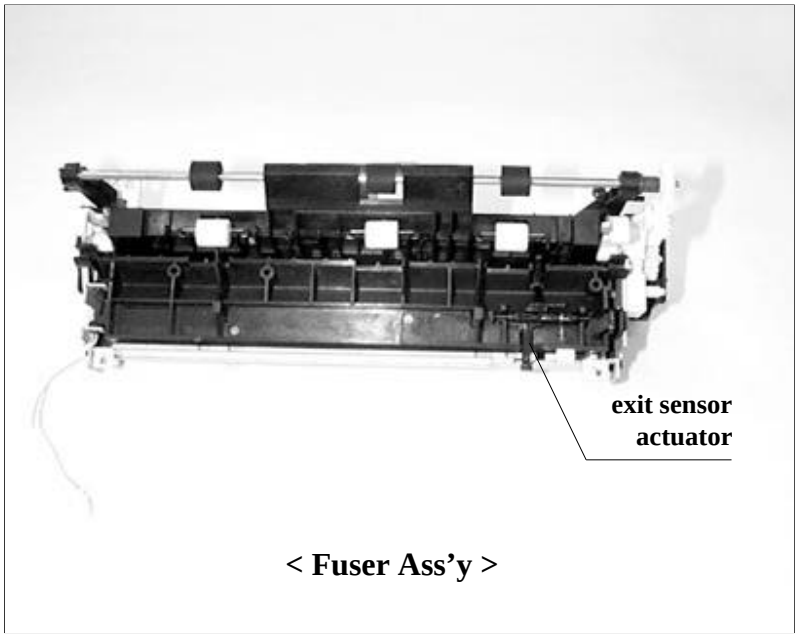
Open the Cover Rear and see the screws and unscrew and remove the Cover pcb.



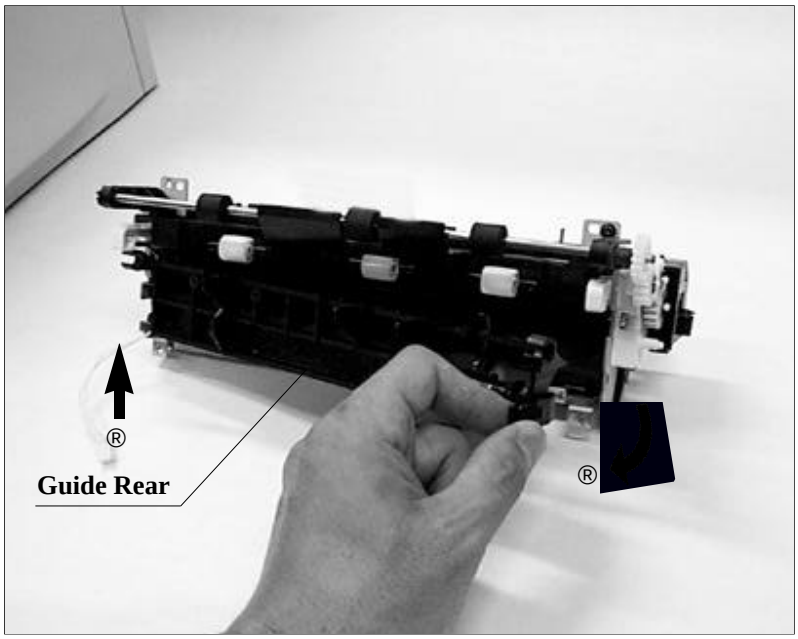
After removing the Cover pcb, unplug the Thermistor connetor from the Engine Board.



See the 4 screws which hold the fuser assy to the frame. You should unscrew and pull the fuser out and it will be removed.
The AC connector for fuser is designed to be directly connected to the AC socket which is positioned in the frame.

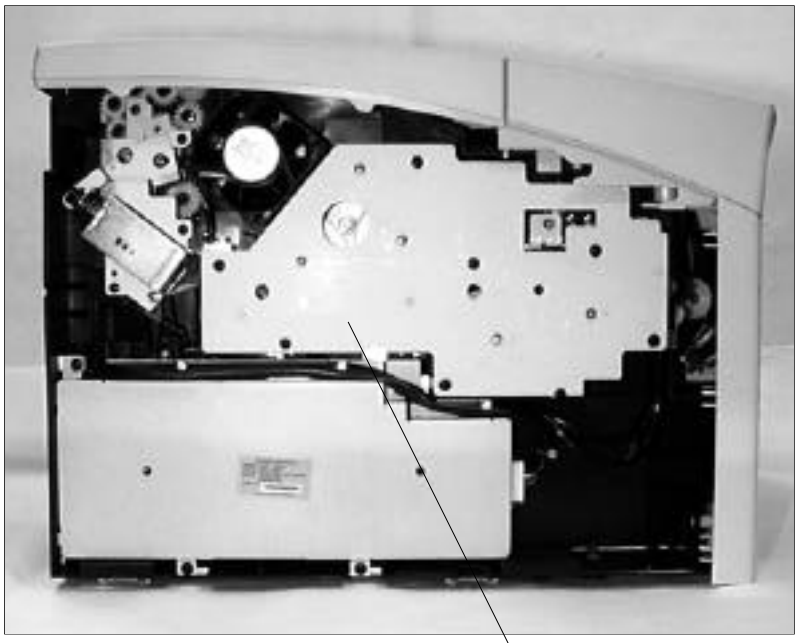


< Fuser Ass'y >

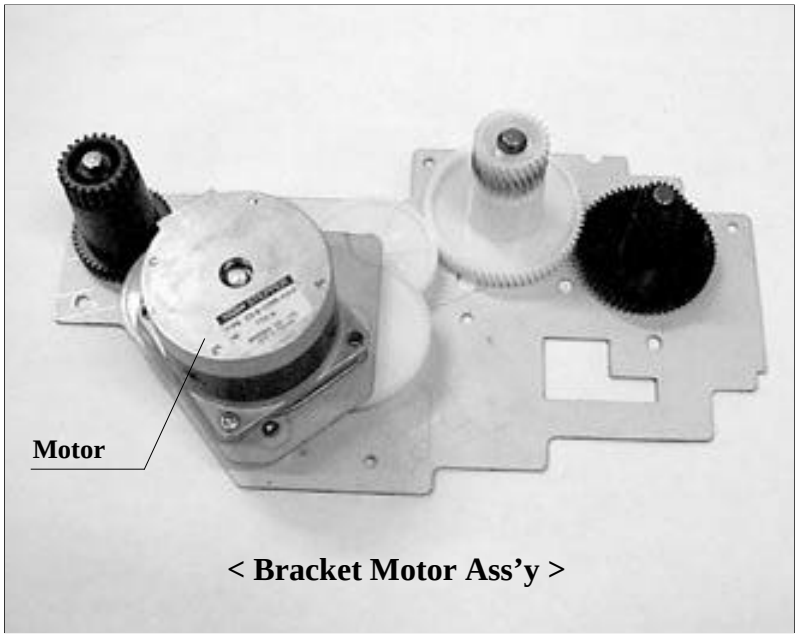


When Jam happens, you can easily remove it by pulling the Guide Rear out like figure. In order to remove Guide Rear, opening the Guide Rear out like figure and pull out hinge of Guide Rear.

4-6 Bracket Motor Ass'y & Cover Open Switch Unit

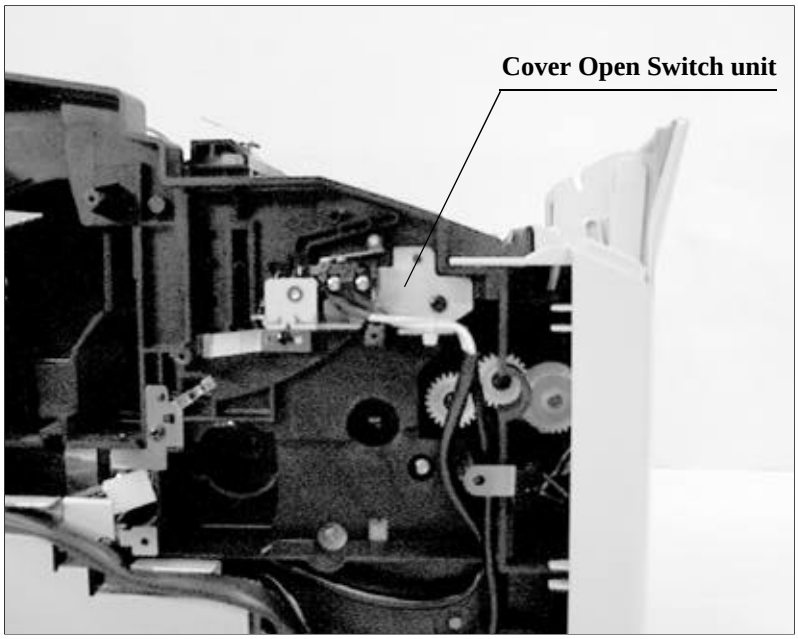


Bracket Motor ass'y is located in the right-upper side. Remove 7 black screws and detach the ass'y from the frame and unplug the motor connector from the motor.



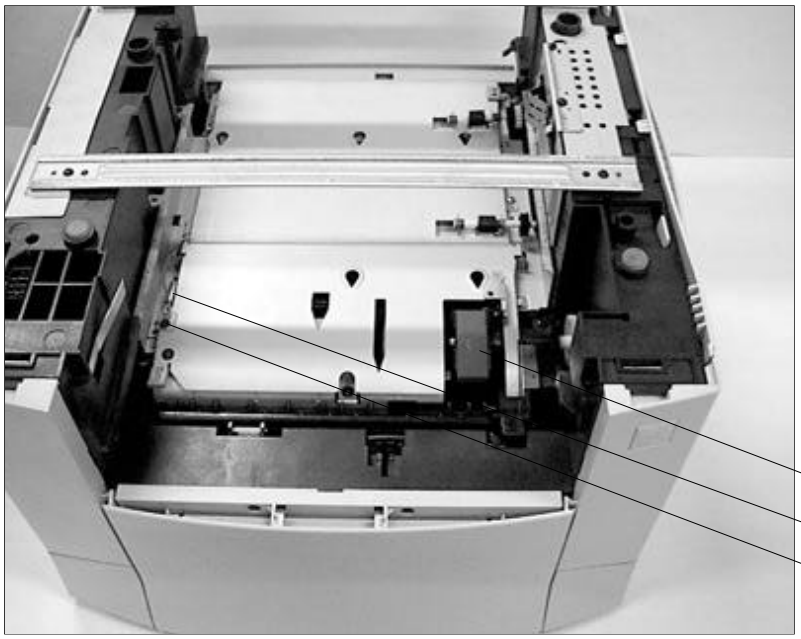
< Bracket Motor Ass'y >

You can see the Bracket Motor ass'y. Motor and several gears are assembled in one gear bracket.

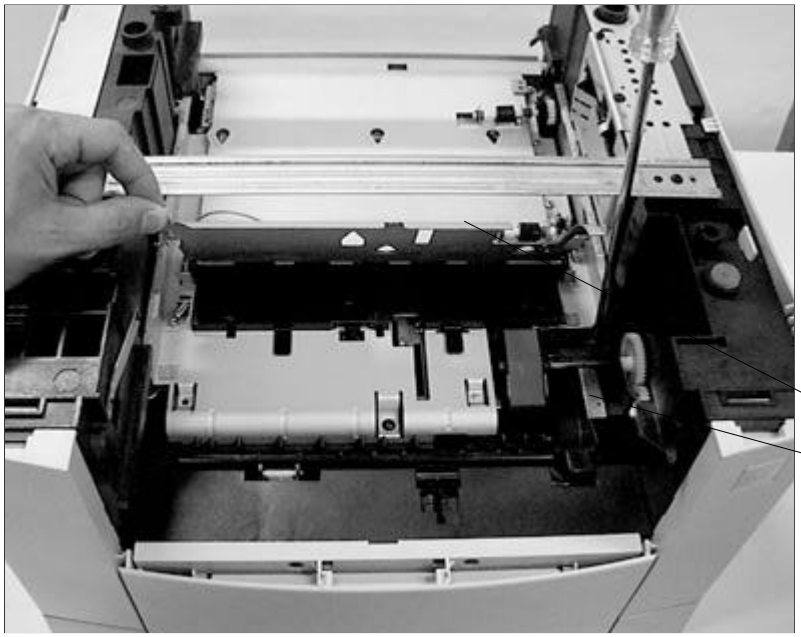


After removing the Bracket Motor ass'y, you can see the Cover Open Switch Unit.
Remove the SMPS.
Refer to SMPS & Bracket
Duplex Ass'y disassembly (4-12)
Detach two Connectors form the SMPS.
Remove 2 screws and detach the unit from the frame.

4-7 Pickup Ass'y

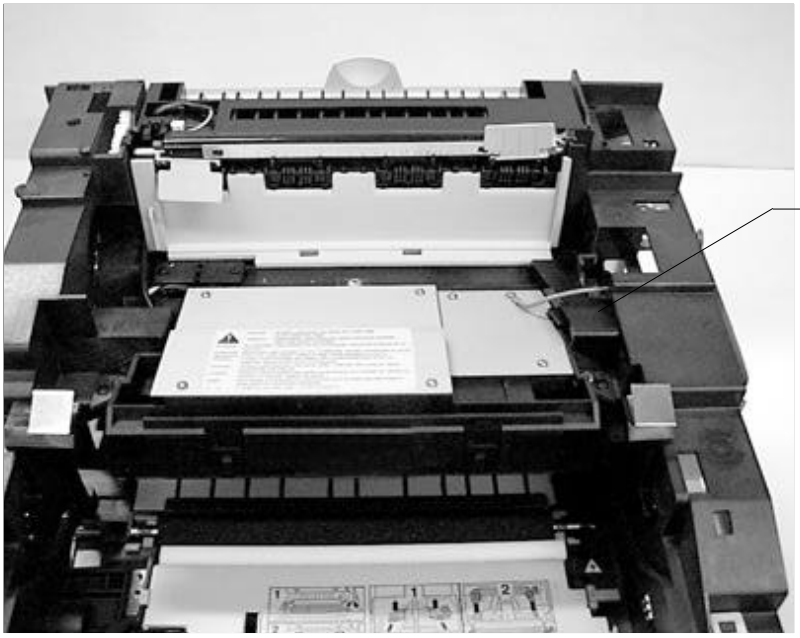


After running about more than 100,000 pages, the pickup ass'y may be needed to be replaced depending on feeding quality.
Remove the screw of Bracket Support and tension spring.

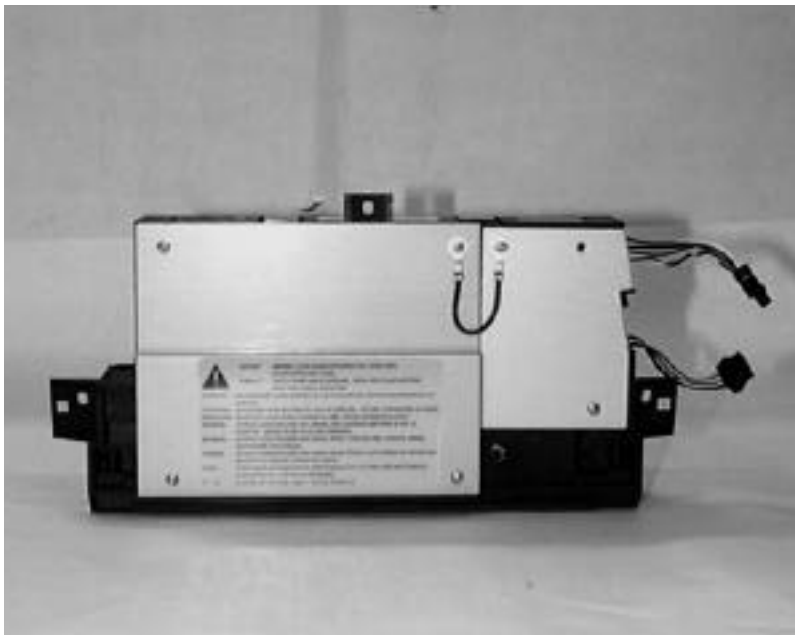


Lift Guide Front Duplex and remove the 3 mounting screws of Pickup Ass'y.

4-8 Laser Scanner Unit



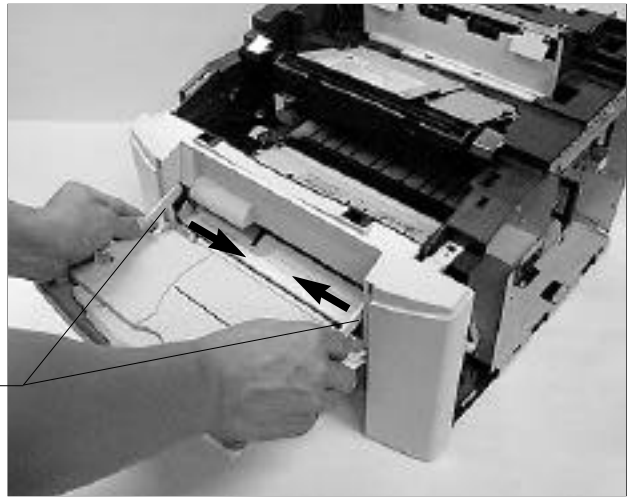
Laser Scanner Unit is located in the upper frame.
In order for LSU disassembling, disassemble the Cover Main, you should take off the left and right cover.
There is wiring protection cover(Cap Wire LSU)for LSU wires.
Remove Cap wire LSU.



There are two wires for LSU. One is LSU motor and the other is Laser beam control. The wires are wire to wire types. You can easily disconnect the wires. After disconnection, unscrew and remove LSU.

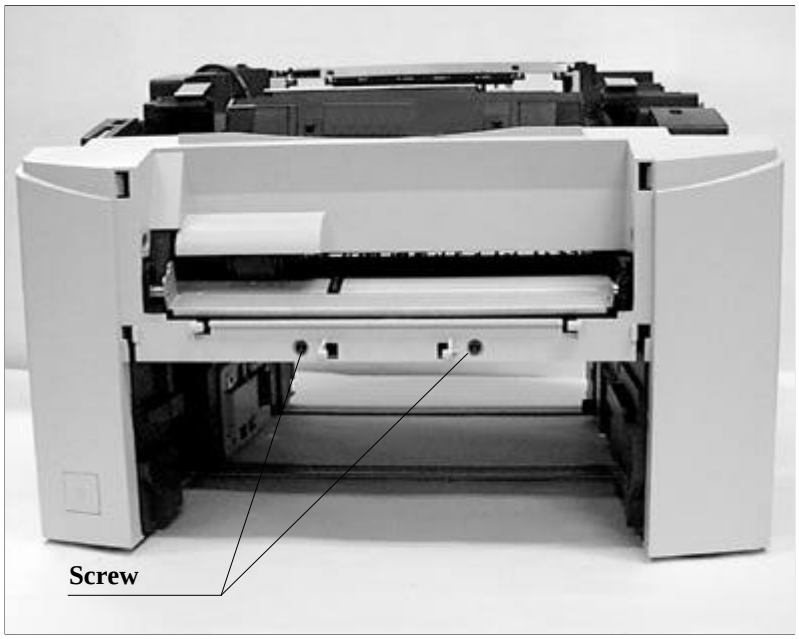
4-9 Multi Purpose Tray

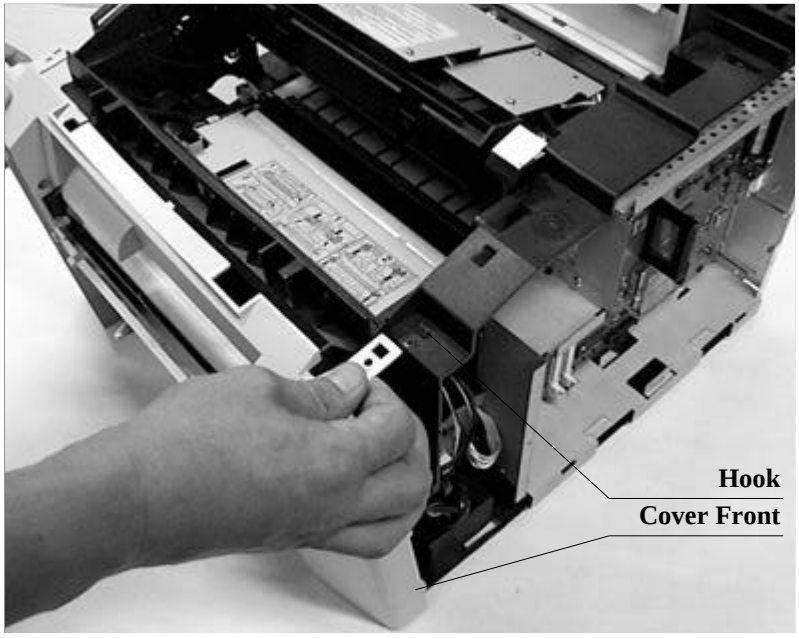
Remove the Cover main.



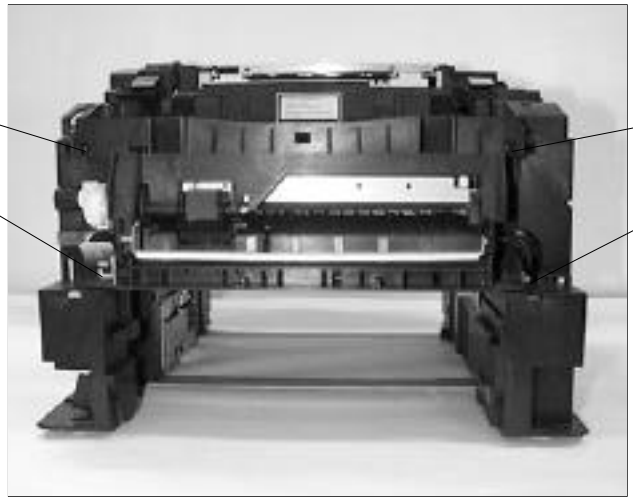
See the Links which hold the MP tray in the both side.
Hold the Links and pull it to the arrow direction.

Hold the MP tray and pull it to the arrow direction.

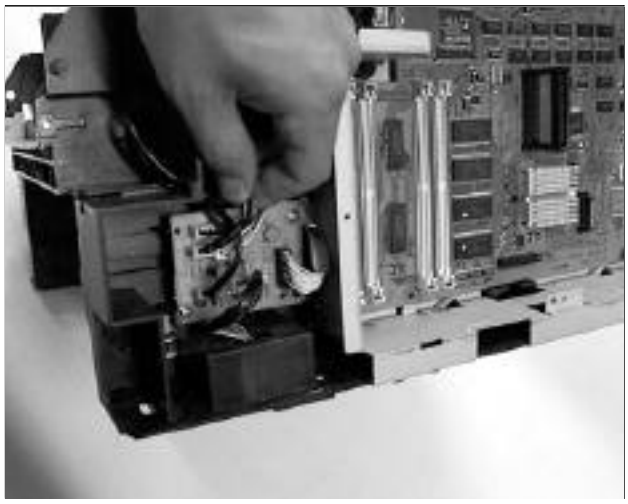




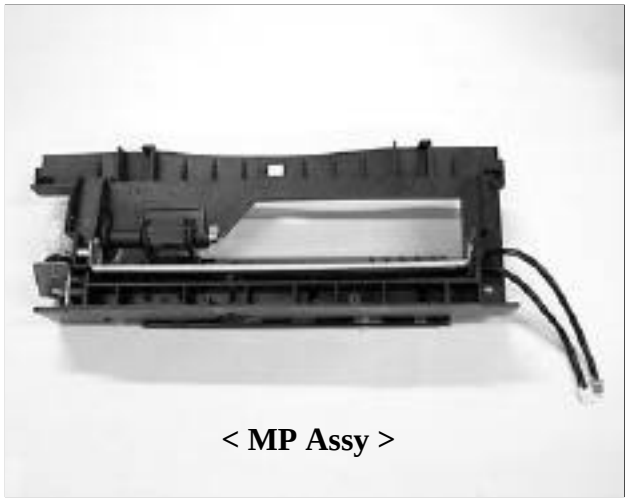
After detaching the Tray MP, see the screws and remove them.
Remove the hook and release the Cover Front by releasing the hook.



After removing Cover Front, detach the MP ass'y by unscrewing 4 screws.

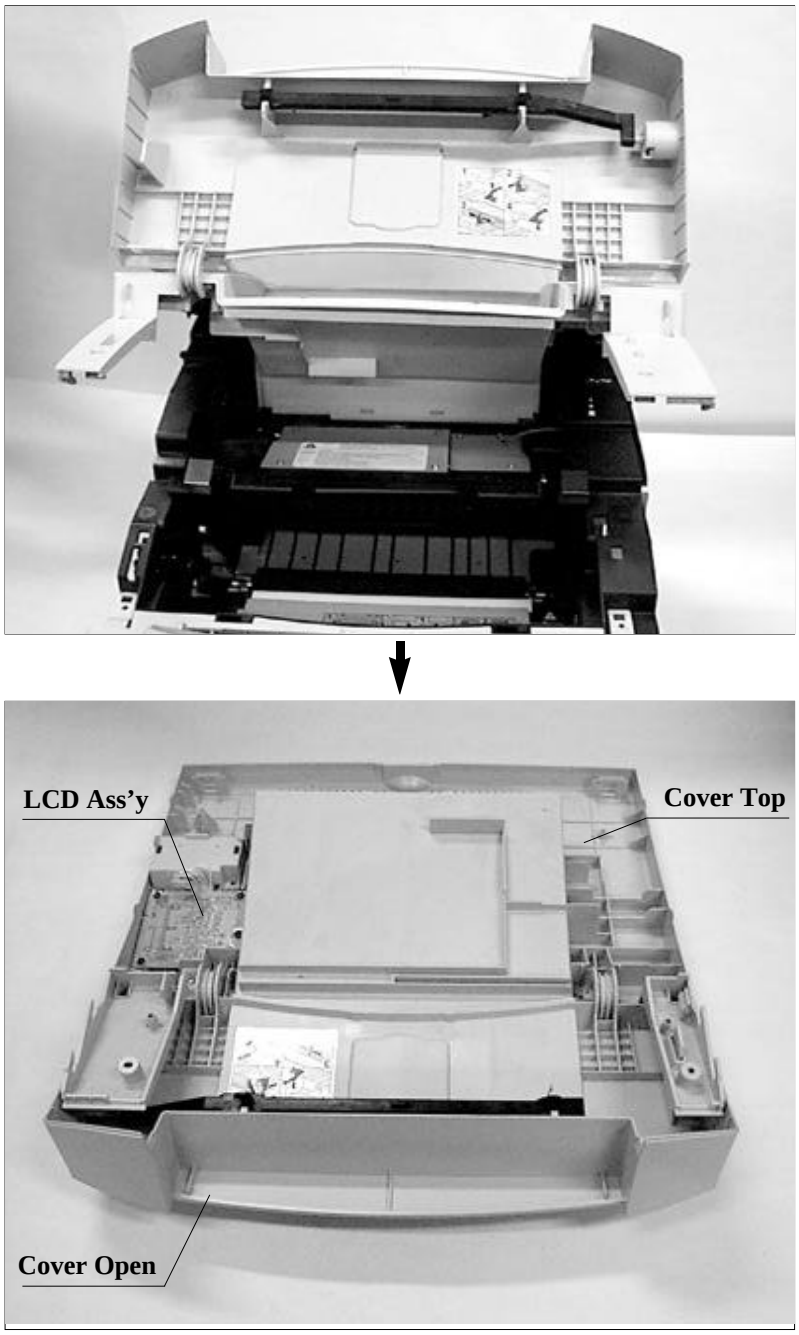


Before detaching MP Ass'y, unplug the MP solenoid and MP sensor connector from the Joint Board.

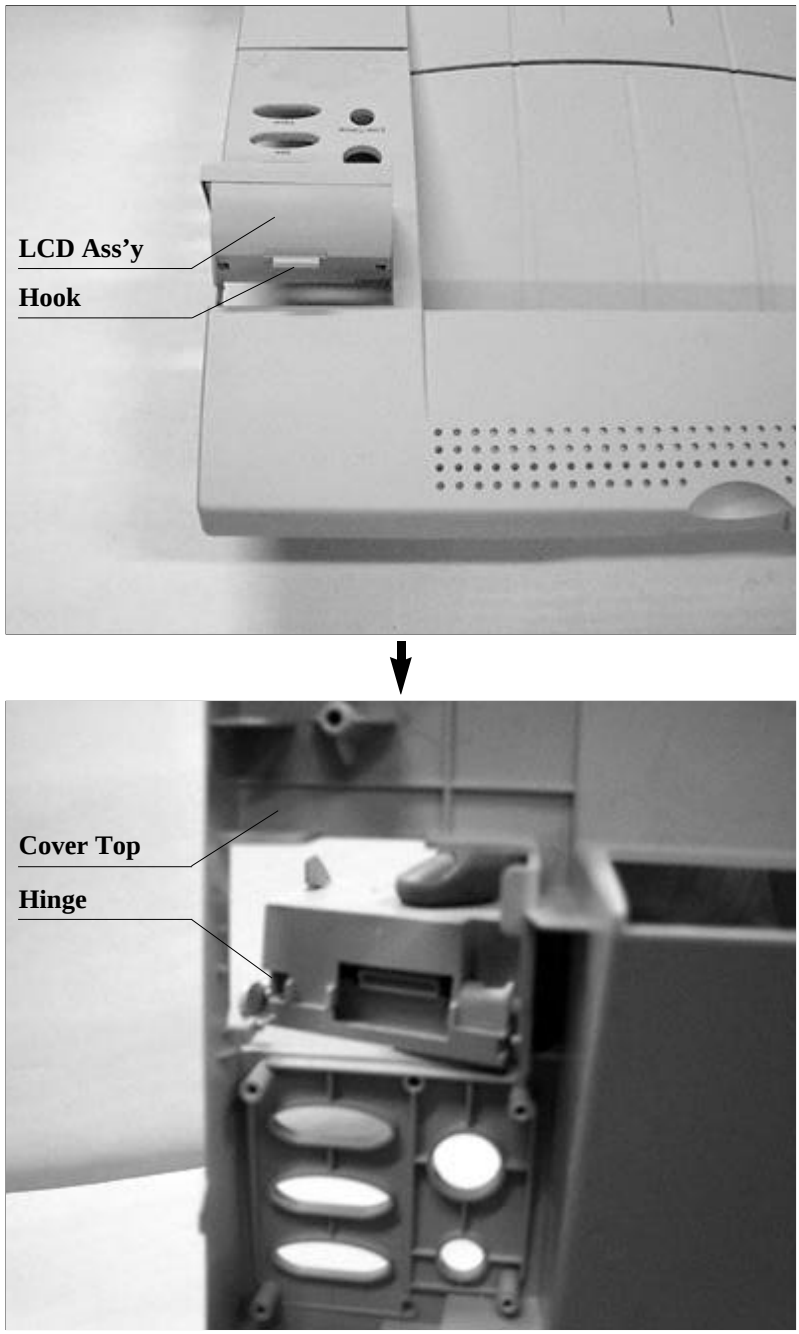


< MP Assy >

4-10 Control Panel



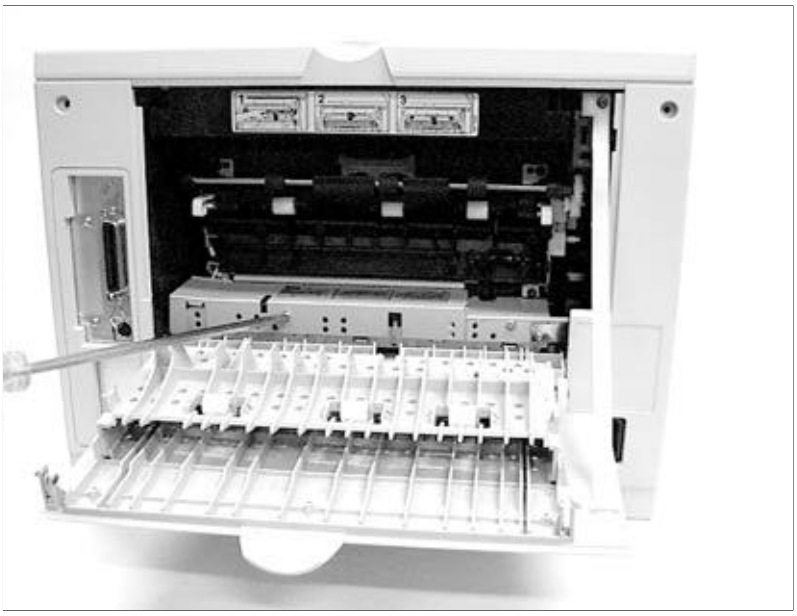
First lift up Cover Main and see the panel wire and disconnect the wire from the panel board. And next step is to remove the panel board which is located in the Cover Top.
Control panel consists of LCD ass'y and Key&LED ass'y.
Remove Key&LED ass'y and remove LCD ass'y.



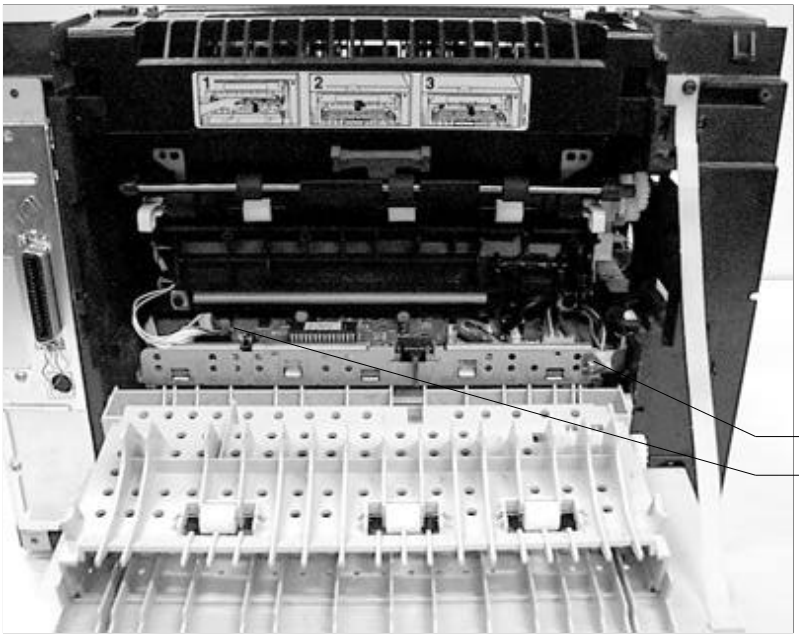
After removing Key&LED ass'y, release the hook of LCD assy from Cover Top and see the hinge for LCD ass'y in the cabinet and release them.
You should spread the hinge of LCD ass'y.
But be careful not to damage the hinge.

4-11 Engine Controller Board

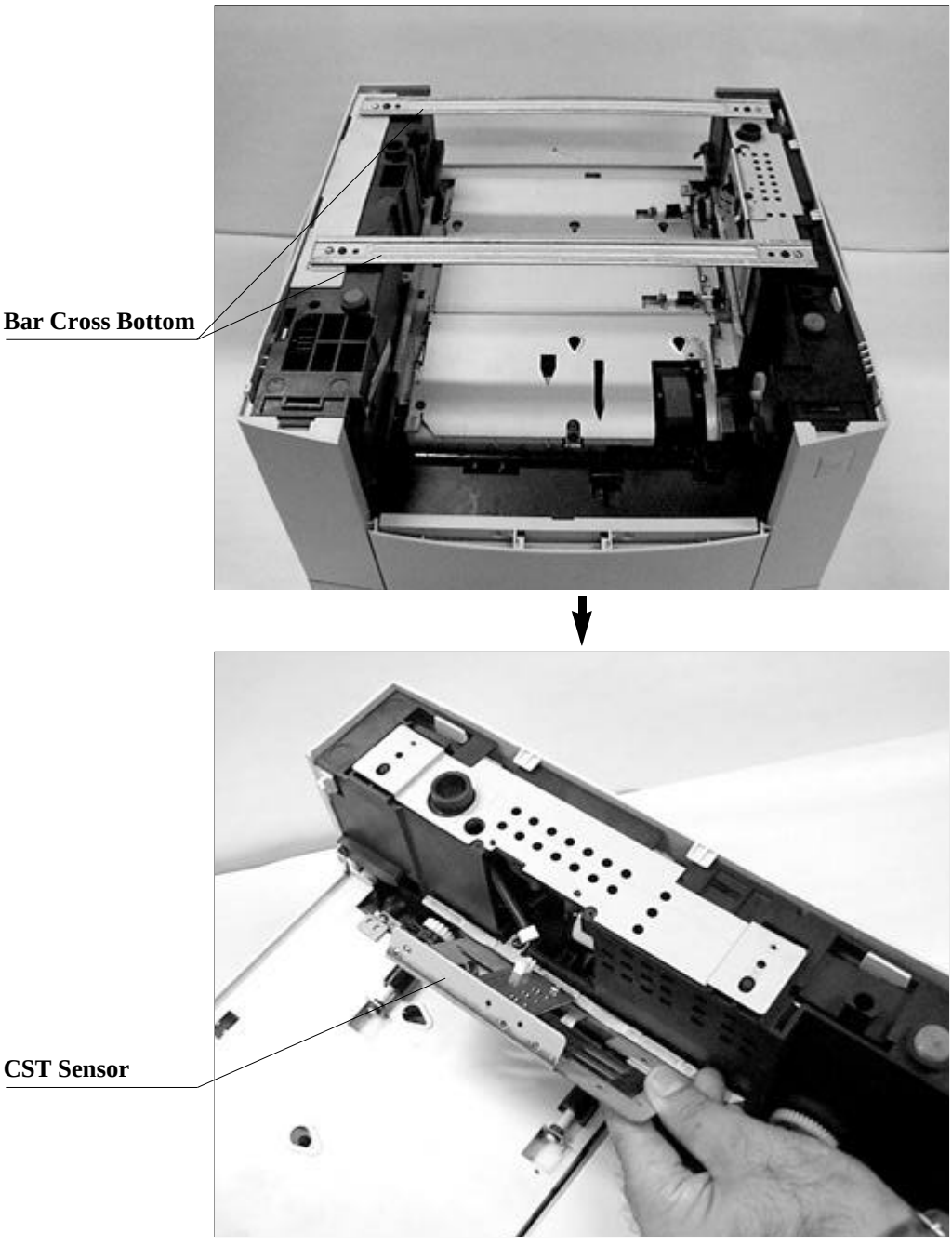
In order for disassembling PCU, the printer should be turned upside down. When turned over, toner may contaminate LSU window. Open the Cover Top and you should insert one paper into the inner like above figure.



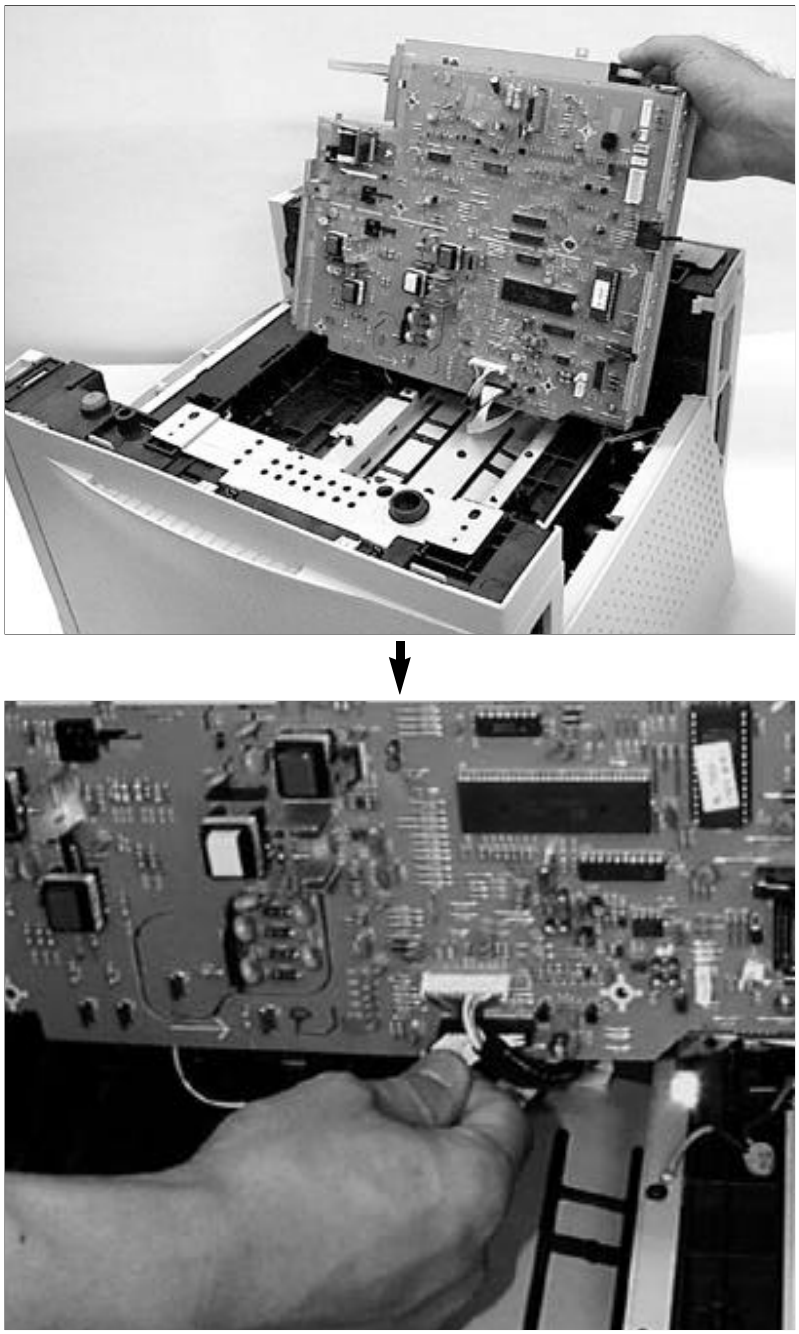
Open the Cover Rear and remove the Cover PCB.



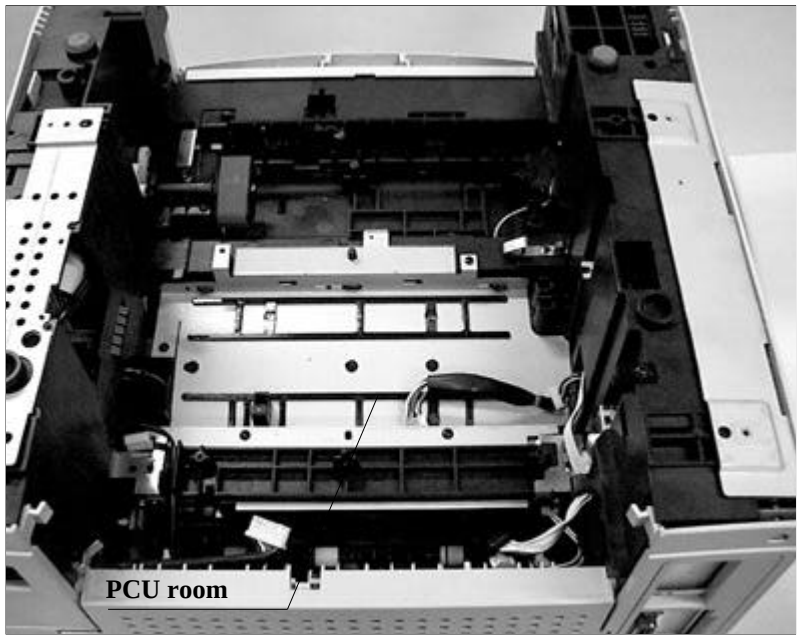
After removing Cover Rear, disconnect all wires from the PCU. and then remove the screw of Ground Shield SMPS, Turn over the printer.

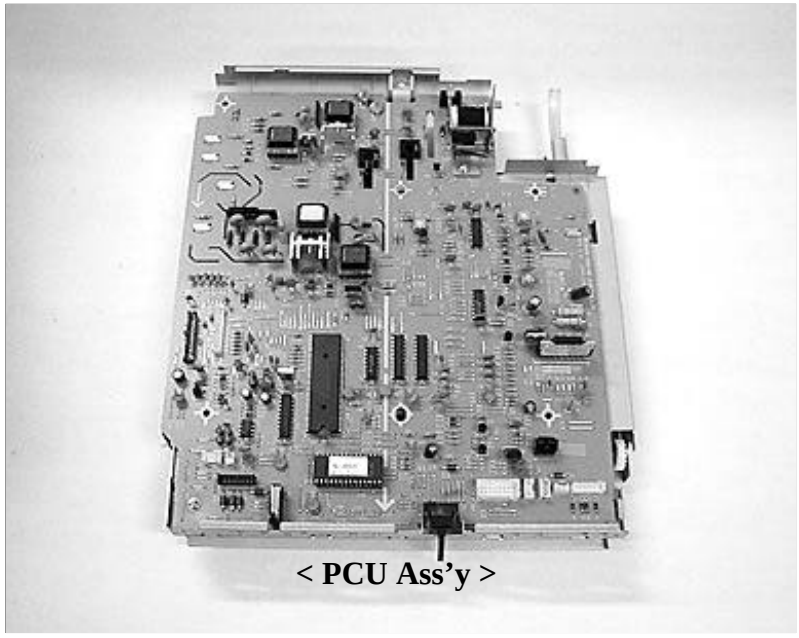


After turning over, remove Bar cross Bottom by unscrewing them 8 screws.
Next remove the CST Sensor and remove the screws in the PCU which are black colored screws.

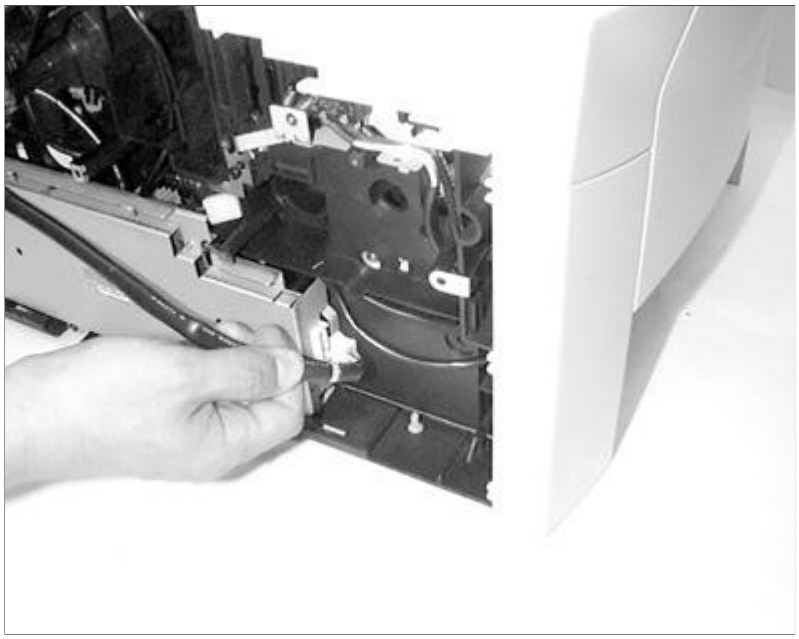


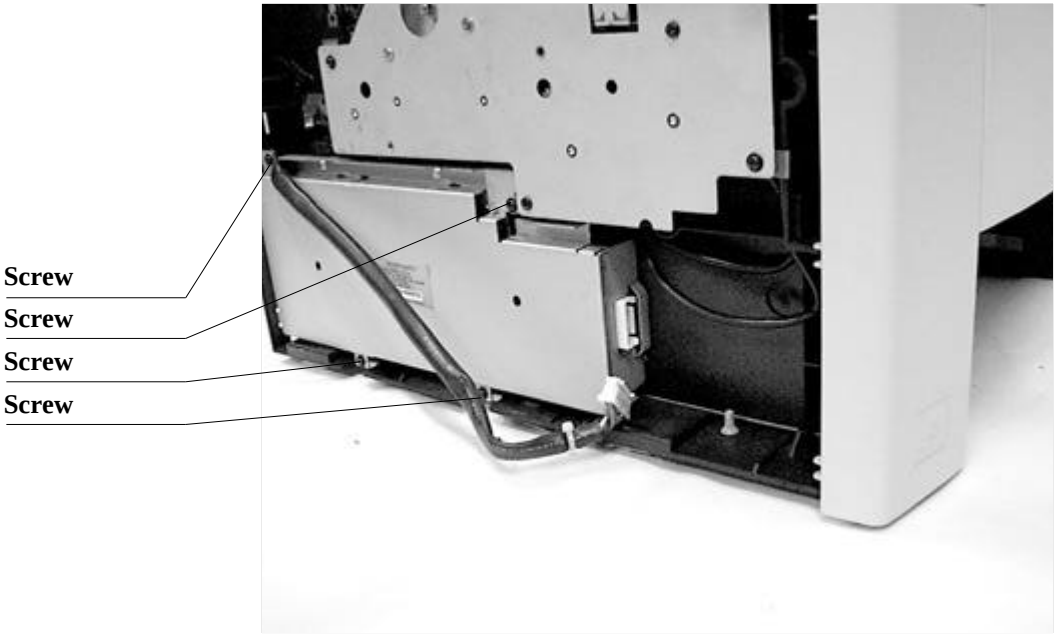
After unscrewing, lift the PCU like above figure. And you can see the connector which are LSU's and 'Video I/F's'. Unplug them with care. Be careful not to be hurt to your hands when you disconnect the wires because the connection is tight and you may pull the connectors strongly.



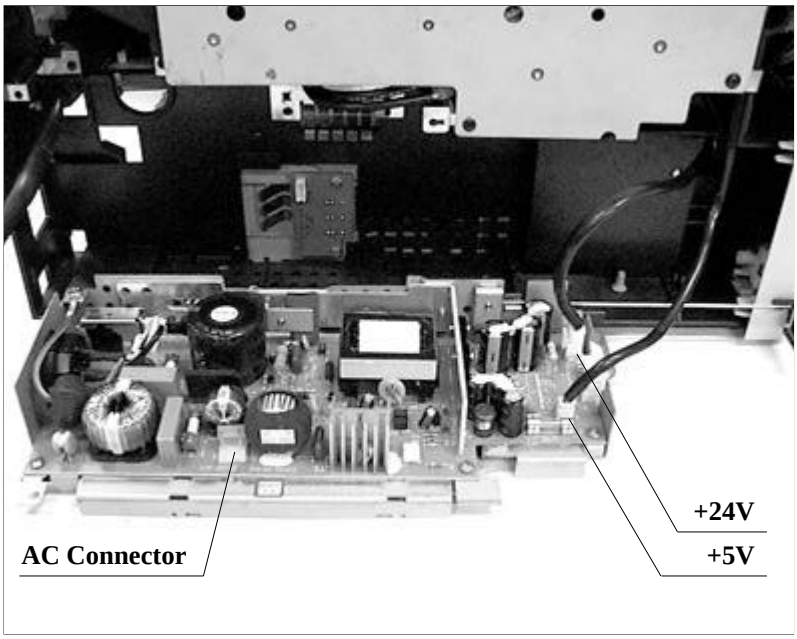


Above is to show the disassembled PCU and Frame. PCU Assy has some sensor, some actuator, solenoid and Shield plate and HVPS circuit. Service man could ask the Assy or repair parts.

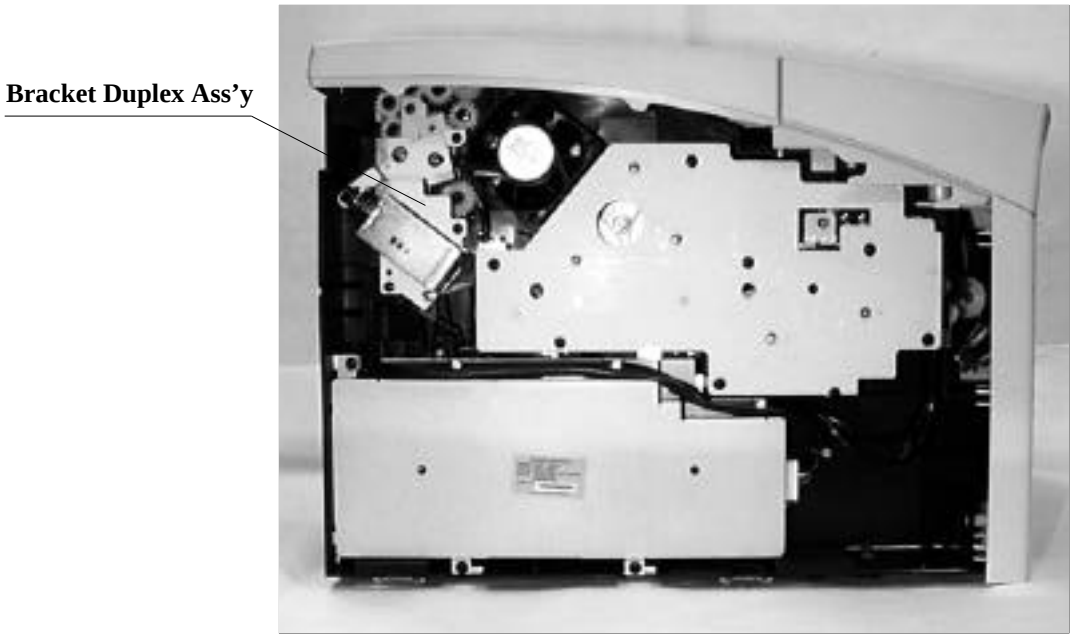




In order to remove SMPS, first remove Cover Left.
Use your left hand to release hook from the frame and slide the Cover Left to backward by use of right hand. After removing Cover Left, you can see the SMPS. Unplug the power connector and release the wire from the wire guide of the SMPS.
Remove four screws and separate SMPS from the frame.
You can see the fuser AC connector and +5V, +24V connector which are connected to the microswitches. Detach the wires from the SMPS.

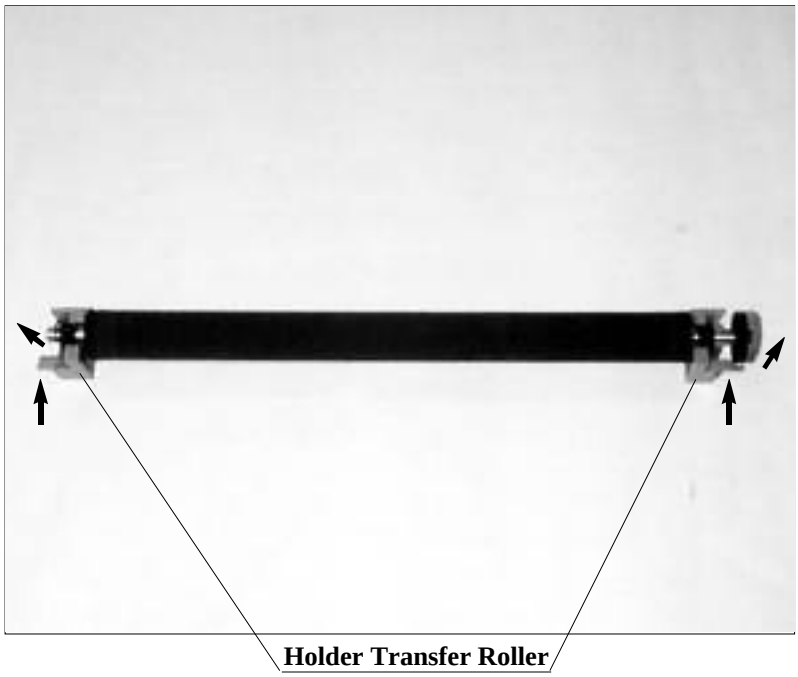


There are 4 connectors to the SMPS. The power connector is +5V and +24V output from SMPS. AC for fuser is AC output from SMPS to the fuser. And there are microswitches whice are attached to the upper frame and which are attached to the upper frame and which are shorted when Top cover is closed, namely interlock Switches for +24V for HVPS, motor and for +5V for Laser beam.



The Bracket Duplex Ass'y is located in the left upper side. Remove the screws and detach the ass'y from the Frame.
In order to remove the connector of Solenoid, first remove Engine Controller Board.
Refer to Engine Controller Board disassembly (4-11)

4-13 Transfer Roller Ass'y



Open the Cover Top, you can see colored levers at each side of Transfer Roller, push the levers which is attached in the Holder transfer Roller to release the Ass'y.

5. Troubleshooting

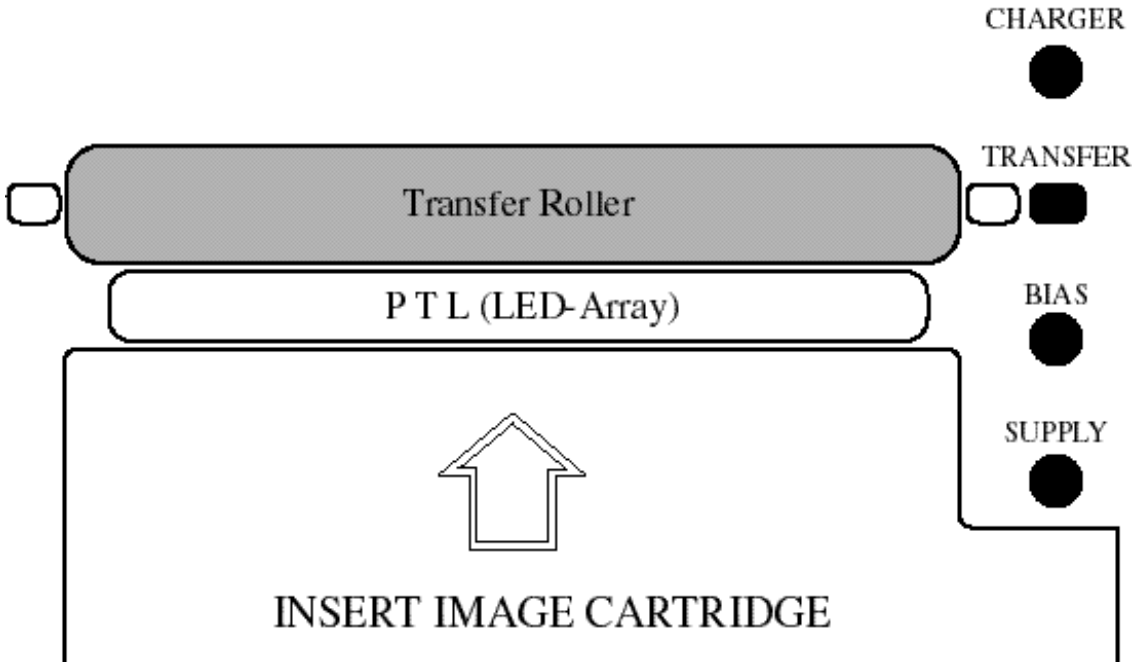
5-1 Print Quality

Error status	Check	Solution
Dark Image	1. Check HVPS output voltage 2. Check terminal contact for HVPS.	1. Refer to HVPS output spec - Replace the engine board - Refer to “4 - 11” 2. Fix the terminal to contact well.
Light Image	1. Check the toner quantity. 2. Check HVPS output voltage 3. Check the terminal contact for HVPS.	1. Replace image cartridge. 2. Refor to HVPS output spec. -Replace the engine board. 3. Fix the terminal to contact well.
Horizontal Density Band.	1. Compare new image cartridge with present one 2. Contamination of Transfer Roller	1. Replace image cartridge 2. Replace transfer roller
Print Contamination	1. Contamination of Fuser Unit 2. Contamination of Heat roller 3. Contamination of OPC Drum	1. Clean Fuser Unit or change If not improved, replace it. 2. Clean Heat Roller - Refer to “4-5” 3. Clean OPC Drum. If not improved, replace image cartridge.
Toner on Backside of printer page	1. Contamination of Fuser Unit 2. Contamination of transfer Roller 3. Contamination fo paper path	1. Clean Fuser Unit. If not improved, replace it. - Refer to “4-5” 2. Replace Transfer Roller 3. Remove the contamination on paper path.
Back Ground	1. Check HVPS output voltage 2. OPC Drum contamination or image cartridge life 3. Check the contamination of PTL lens 4. Check the terminal contact for HVPS. 5. Check the contamination fo transfer roller.	1. Refer to HVPS output spec - Replace the engine board 2. Replace the image cartridge 3. Clean the lens with a soft dry cloth 4. Fix the terminal to contact well. 5. Relpace Transfer Roller
Vertical Black Streak and band	1. OPC Drum scar 2. OPC Drum damage	1. Clean OPC Drum 2. Replace image cartridge
Vertical White Streak	1. Contamination of LSU window	1. Clean LSU window 2. If not improved, replace image cartridge
Partial Black Image (periodic)	1. OPC Drum scar or particle 2. Heat roller scar or particle 3. Develope roller scar or particle 4. Charge roller scar or particle	1. Clean OPC Drum & roller 2. Cleaning heat roller 3. Clean the develope roller. If not improved, replace image cartridge. 4. Clean the charge roller. If not improved, replace image cartridge.
Partial White Image (not periodic)	1. OPC Drum scar or particle 2. Check the cartridge life	1. Clean OPC Drum 2. Replace image cartridge

Error status	Check	Solution
No image (all white)	1. Check HVPS voltage	1. Refer to HVPS output spec. - Replace the engine board
	2. Check the GND OPC contact. - Contact among GND OPC contact points. - Image cartridge. - GND OPC terminal on frame - GND OPC terminal on the engine board - Confirm the voltage between GND-OPC and GND-Frame. : -130V approx	2. Fix contact points to fit well.
	3. Check LSU operation. - Refer to DCU control “05”	3. Replace the LSU. -Refer to “4-8”
	4. Compare new video board with present one.	4. Replace the video board.
	5. Toner empty	5. Replace the image cartridge.
All Black Image	1. Check the charger voltage 2. Check the terminal contact 3. Compare new video board with present one	1. Refer to HVPS output spec - Replace the engine board 2. Replace terminal 3. Replace video board

5-2 HVPS Output Spec

DCU	CODE NO.	HVPS OUTPUT	REMARK
CHARGER	"01"	- 1.55 KV	1. Turn off the printer 2. Open the rear cover and disassemble the cover-shield. 3. Connect the DCU on engine board and close the rear cover. 4. Open the top cover. 5. Remove image Cartridge. 6. Push the Cover Open Switch 7. Select the Diagnostic mode and measure HVPS output. ° Recommanded Test Equipment - DVM -High Voltage Probe
TRANSFER "-"	"02"	-1KV~ -1.4KV	
TRANSFER "+"	"03"	+1.8 KV	
BIAS	"04"	- 500 V	
SUPPLY	"04"	- 700 V	
OPC GND	¶	- 130 V	



5-3 Malfunction

Error status	Check	Solution
No Power	1. Check FUSE - F1(8A), F2(5A) OPEN. 2. Check FUSE. - F3(250V/3A) OPEN.	1. Replace SMPS. - Refer to “4-12” 2. Measure the resistance +5V and GND. (Engine board CN5-pin6 and CN5-pin9). If find the short circuit, replace the Engine board.
Internal Error 11 (Fuser Error)	1. Check Fuser unit - Thermostat open - hallogen lamp defect Normal : 110V version - 2~3 • 220V version - 5~6 • 2. Check themistor wire assembly defect. Normal : 2~400k • 3. Check SMPS - CN2 conection on SMPS - Fuse(F2) open - Defect of component related to Fuser control. 4. Check Engine Board - CN7 connection - Fuser control line: Cn5-2 level (Lamp on : 0.2V, Lamp off:24V)	To disassemble the Fuser unit, refer to “4-5”. 1. If the thermostat of the fuser unit is opened. replace it. 2. If the thermistor wire of the fuser unit is defected, replace it. 3. If the fuser unit is normal, replace SMPS. 4. If not normal operation after replacing it, replace the engine board.
Cover open	Check the Cover Open operation 1. Cover open unit defect 2. Cable damage and connection 3. Engine board defect	1. Replace cover open Unit -Refer to “4-6” 2. Replace cover open switch assembly, and connect properly. 3. Replace the engine board.

Error status	Check	Solution
Jam 2 "Paper is stopped just after exit sensor"	1. Check the exit sensor. - Refer to DCU mode "08" 2. Check the exit sensor actuator. 3. Check the Exit Roller. 4. Check the Cover Rear. 5. Check the Contamination of Fuser Unit	1. Replace Exit sensor. - Refer to "4-11" 2. Replace Exit sensor actuator. - Refer to "4-5, 6-6" 3. Replace Exit Roller. - Refer to "4-3, 6-1" 4. Replace Cover Rear. - Refer to "6-1" 5. Replace or Clean Fuser Unit - Refer to "4-5, 6-6"
Duplex Jam 1	1. Check the operation of Duplex Clutch - Refer to DCU mode "12" 2. Check the Duplex sensor 1. - Refer to DCU mode "07" 3. Check the Duplex sensor 1 actuator. 4. Check the Cover Rear. 5. Check the bracket duplex unit 6. Check the duplex solenoid. The resistance of duplex solenoid: 40~50 ohm.	1. Replace Duplex Clutch. - Refer to "4-6" 2. Replace the DS1 on Engine Board. 3. Replace Duplex sensor 1 actuator. - Refer to "4-11" 4. Replace Cover Rear. - Refer to "6-1" 5. Replace bracket duplex unit - Refer to "6-8" 6. Replace duplex solenoid ass'y.
Duplex Jam 2	1. Check the Duplex sensor 2. - Refer to DCU mode "07" 2. Check the Duplex sensor 2 actuator. 3. Check the Gear of shield pcb - Check all the gear for correct installation	1. Replace the DS2 on Engine board. 2. Replace Duplex sensor actuator. 3. Replace Gear of shield pcb - Refer to "4-11, 6-7"
PTL Error (Pre Transfer Lamp)	1. Check the LED Array. 2. Check the cable connection or wire defect. 3. Check Joint board.	1. Replace LED Array. - Refer to "6-2" 2. Replace harness or reconnection. 3. Replace Joint board. - Refer to Disassembly
Toner Empty	1. Check image cartridge life 2. Check Toner sensor contact. 3. Check Joint board 4. Compare new image with present on.	1. Replace image cartridge. 2. Replace harness or reconnection. 3. Replace Joint board. - Refer to "4-4" 4. Replace image cartridge.
OUT-BIN Full	1. Check OUT-BIN sensor. - Refer to DCU mode "09" 2. Check OUT-BIN sensor actuator. 3. Check cable connection or wire defect	1. Replace OUT-BIN sensor. 2. Replace OUT-BIN sensor actuator. 3. Connect the cable correctly or replace the cable.
Internal Error 20 (Engine Error)	1. Check the Cable between Engine and Video controller. (Engine board CN10®Video controller board J11.) 2. Engine board defect.	1. Connect the cable correctly or replace the cable. - Refer to "4-4" 2. Replace Engine board.

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Error status	Check	Solution
Internal Error 10 (Scanner Error)	1. Check the DC supply for laser scanning unit 2. Check laser scanning unit - Refer to DUC mode “05” 3. Check the cable connection and defect 4. Engine board.	1. If +5Vs for laser diode isn’t supplied. check the cover switch assembly for +5Vs and fix it, 2. If the DC power supply for laser scanning unit has normal operation, replace the laser scanning unit 3. Replace cable and connect properly. 4. If not normal operation after replacing it, replace the engine board.
Jam 0 1. Paper is not exitted from cassette 2. Paper is stopped before feed sensor.	**1. 1st cassette feeding** 1) Check the operation of Pick-up Clutch - Refer to DCU mode “06” 2) Check PAD of Pickup roller. 3) Check the Gear of Pickup Unit. 4) Check paper installation in cassette	 1. Replace the Pick-up solenoid on Engine Board. - Refer to “4-11” 2. Replace PAD. - Refer to “4-7, 6-5” 3. Replace Pickup Unit Gear. - Refer to “4-7, 6-5” 4. Install paper properly.
	2. Multi purpose feeding 1) Check the operation of multi purpose Clutch - Refer to DCU mode “13” - Check MP solenoid. The resistance of MP solenoid 70~80 • 2) Check PAD of Pickup roller 3) Check Joint board Measure the CN503-2pin 4) Check the Gear of multi Purpose Pickup Unit 5) Check cable connection or wire defect.	 1. Replace MP solenoid. If not normal operation after replacing it, replace the engine board. - Refer to “4-11”. 2. Replace PAD - Refer to “4-9, 6-4” 3. Replace Joint board. - Refer to “4-4” 4. Replace Pickup Unit Gear. 5. Connect the cable correctly or replace the cable.
	3. Second cassette feeding 1) Check Pickup Clutch for SCF. - The resistance of SCF solenoid: 70~80 • 2) Check PAD of Pickup roller 3) Check the Gear of pickup Unit 4) Check paper installation in cassette. 5) Check cable connection or wire defect.	 1. Replace the pick-up clutch for SCF. If not improved, replace SCF board 2. Replace PAD. - Refer to “6-11” 3. Replace Pickup Unit Gear. - Refer to “6-11” 4. Reinstiall paper properly. 5. Connect the cable correctly, or replace the cable.
Jam 1 “Paper is stopped on feed sensor”	1. Check the Feed sensor. - Refer to DCU mode “08” 2. Check the Feed Sensor actuator 3. Check the paper installation in cassette.	1. Replace Feed Sensor. - Refer to “4-11” 2. Replace Feed Sensor actuator. - Refer to “4-11, 6-2” 3. Reinstall paper properly.

Error status	Check	Solution
Main Motor	- Refer to DCU mode “00” 1. Check the supply voltage. (+24Vdc) Engine board CN1 -2,5 pin 2. Check the Motor cable for cuts or pinched wiring. 3. Check the resistance for Motor between pin No. 1 to 3(4 to 6) The resistance of motor : 3 • approx. 4. Check the Engine board. 5. Check Gear of Motor Drive Unit. - Check all the gear for correct installation.	1. Replace to cover open unit. 2. Replace cable 3. Replace Motor. 4. Replace Engine board. 5. Replace Motor Drive Unit - Refer to “4-6, 6-9”
Paper Empty	**1) 1’st Cassette Feeder** 1. Check the paper empty sensor - Refer to DCU mode “07” 2. Check the paper empty sensor actuator.	1. Replace the paper empty sensor on Engine board. 2. Replace paper empty sensor actuator.
	2) Multi Purpose Feeder 1. Check the paper empty sensor for MP. - Refer to DCU mode “07” 2. Check the MP paper empty sensor actuator.	1. Replace MP sensor assembly. 2. Replace MP paper empty sensor actuator. If not improved, replace the engine board
	3) Second Cassette Feeder 1. Check the paper empty sensor for SCF - Refer to DCU mode “07” 2. Check the paper empty sensing actuator for SCF.	1. Replace the paper empty sensor on S.C.F board. 2. Replace MP paper empty sensor actuator.

5-4 .Connector Pin Assignment

5-4-1. Engine Board Connector Pin Assignment

CONNECTOR	PIN-NO	DESCRIPTION	IDLE	ACTIVE	IN/OUT
CN1 MOTOR	1	MOTOR_PB*	+24V	PULSE	O
	2.5	+24V	+24V	+24V	-
	3	MOTOR_PB	+24V	PULSE	O
	4	MOTOR_PA*	+24V	PULSE	O
	6	MOTOR_PA*	+24V	+24V	O
CN2 DUPLEX	1	+24V	+24V	+24V	O
	1	D_CLUTCH	+24V	L	-
CN3 FAN	1	+24V	+24V	+24V	-
	2	NC	NC	NC	-
	3	FAN	+24V	L	O
CN4 CASSETTE BOARD	1	CAST_SENS1	H	L	I
	2	CAST_SENS2	H	L	I
	3	CAST_SENS3	H	L	I
	4	DGND	DGND	DNGD	-
CN5 SMPS	1	+24VS2	+24V	+24V	-
	2	FUSERON	+24V	L	O
	3,5,7	AGND	AGND	AGND	-
	4	+5Vs	+5V	+5V	-
	6,8,10	+5V	+5V	+5V	-
	9,11,12	DGND	DGND	DGND	-
	13,14,15,16	+24VS2	+24V	+24V	-
CN6 JOINT BOARD INTERFACE	1,2,3	+5V	+5V	+5V	-
	4	MP_CLUTCH	L	0.7V	O
	5	+5Vs	+5V	+5V	-
	6	Q_LAMP	L	0.7V	O
	7,9	+24VS2	+24V	+24V	-
	8	SCF_READY	H	L	I
	10	STS_SCF	PULSE	PULSE	I
	11,13	AGND	AGND	AGND	-
	12	MP_PAPER	H	L	I
	14	TONER	H	L	I
	15,17	DGND	DGND	DGND	-
	16	CMD_SCF	PULSE	PULSE	O
	18	OPT_CLK	PULSE	PULSE	O
CN7 THERMISTOR	1	THERMISTOR	-	-	-
	2	THERMISTOR	-	-	-
CN8 DCU	1	+5V	+5V	+5V	-
	2	DCU_DATA	PULSE	PULSE	I/O
	3	DCU_CLK	CLOCK	CLOCK	O
	4	DGND	DGND	DGND	-

CONNECTOR	PIN-NO	DESCRIPTION	IDLE	ACTIVE	IN/OUT
CN9 LSU	1.4	DGND	DGND	DNGD	-
	2	VDO	H	L	O
	3	LDON	H	L	O
	5	+5Vs	+5V	+5V	-
	6	HSYNC	H	L	I
	7	LREADY	H	L	I
	8	PMOTOR	+24V	L	O
	9	AGND	AGND	AGND	-
	10	+24VS2	+24V	+24V	-
CN10 VIDEO CONTROLLER INTERFACE	1	EBUSY	H	L	O
	2,17,19,20,21 22,23,24	DGND	DGND	DNGD	-
	3	EMSG	H	L	O
	4	EXIT_PAP	H	L	O
	5	CCLK	H	PULSE	I
	6	PRINT	H	L	I
	7	VDI	H	L	I
	8	CPRDY	-	-	
	9	PSYNC	H	-	O
	10	READY	H	L	O
	11	HSYNC	H	L	O
	12	NC	NC	NC	-
	13,15,16,18 25,27,28	+5V	+5V	+5V	-
	14	CMSG	H		I

5-4-2. Joint Board Connector Pin Assignment

CONNECTOR	PIN-NO	DESCRIPTION	IDLE	ACTIVE	IN/OUT
CN501 JOINT BOARD INTERFACE	1,2,4	+5V	+5V	+5V	-
	3	MP_CLUTCH	L	0.7V	O
	5	Q_LAMP	L	0.7V	O
	6	+5Vs	+5V	+5V	-
	7	SCF_READY	H	L	I
	8,10	+24VS2	+24V	+24V	-
	9	STS_SCF	PULSE	PULSE	I
	11	MP_PAPER	H	L	O
	12,14	AGND	AGND	AGND	-
	13	TONER	H	L	I
	15	CMD_SCF	PULSE	PULSE	O
	16,18	DGND	DGND	DGND	-
	17	OPT_CLK	PULSE	PULSE	O
CN502 SCF INTERFACE	1	+5V	+5V	+5V	-
	2	AGND	AGND	AGND	-
	3	+24V	+24V	+24V	-
	4	STS_SCF	PULSE	PULSE	O
	5	CMD_SCF	PULSE	PULSE	I
	6	OPT_CLK	PULSE	PULSE	I
	7	SCF_READY	H	L	O
	8	DGND	DGND	DGND	-
CN503 MP_CLUTCH	1	+24V	+24V	+24V	-
	2	MP_CLUTCH	+24V	L	O
CN504 Q_LAMP	1	+5V	+5V	+5V	-
	2	Q_LAMP	+5V	L	O
CN505 MP_SENSOR	1	MP_SENSOR	H	L	I
	2	DGND	DGND	DGND	-
	3	+5V	+5V	+5V	-
CN506 TONER	1	+5V	+5V	+5V	-
	2	TONER	H	L	O
	3	AGND	AGND	AGND	-

5-4-3. S.C.F Board Connector Pin Assignment

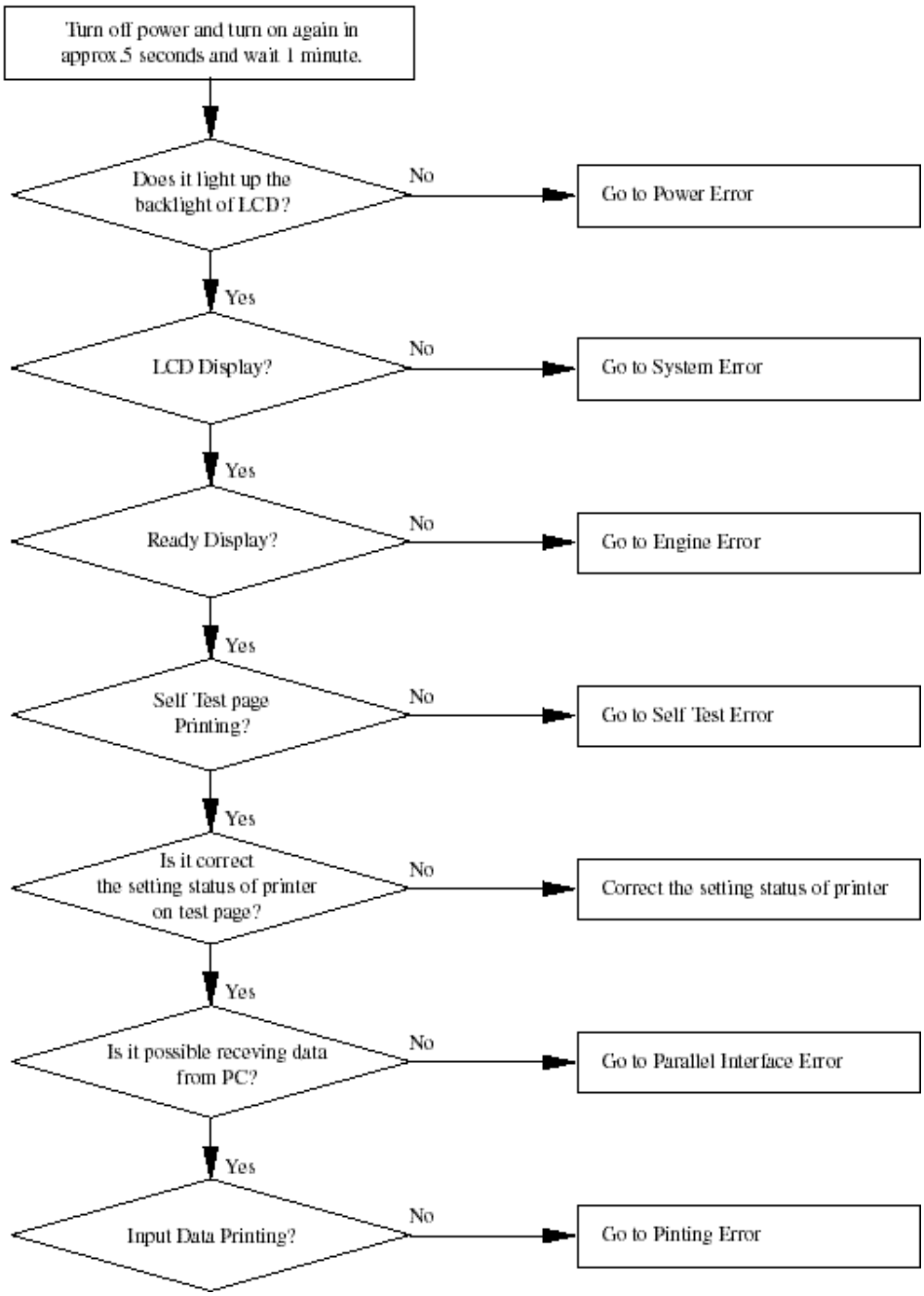
CONNECTOR	PIN-NO	DESCRIPTION	IDLE	ACTIVE	IN/OUT
CN1 ENGINE JONIT BOARD INTERFACE	1	+5V	+5V	+5V	-
	2	AGND	AGND	AGND	-
	3	+24V	+24V	+24V	-
	4	STS_SCF	PULSE	PULSE	O
	5	CMD_SCF	PULSE	PULSE	I
	6	OPT_CLK	PULSE	PULSE	I
	7	SCF_READY	H	L	O
	8	DGND	DGND	DGND	-
CN2 MOTOR	1	MOT_PA	+24V	PULSE	-
	2	MOT_PB	+24V	PULSE	O
	3	MOT_PA*	+24V	PULSE	O
	4	MOT_PB*	+24V	PULSE	O
CN3 DCU	1	+5V	+5V	+5V	-
	2	DCU_IN/OUT	PULSE	PULSE	I/O
	3	DCU_CLK	CLOCK	CLOCK	O
	4	DGND	DGND	DNGD	-
CN4 PICK UP	1	+24V	+24V	+24V	-
	2	CLUTCH	+24V	L	O
CN5 CASSETTE	1	CASET_1	H	L	I
	2	CASET_2	H	L	I
	3	CASET_3	H	L	I
	4	DGND	DGND	DNGD	-

5-5 .Troubleshooting of Video Controller

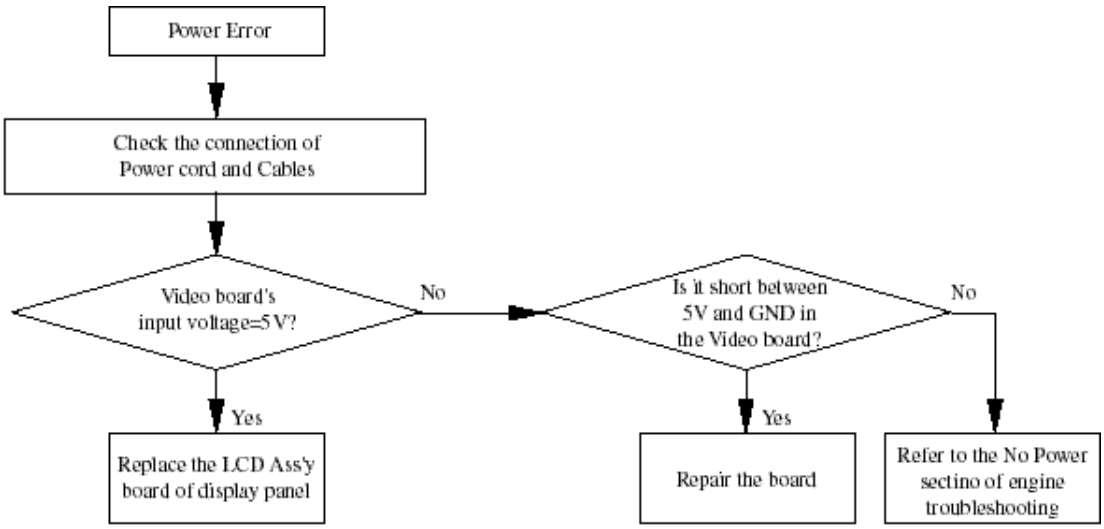
Most electronic products are sensitive to connectors and assemblies that are not complete seated. Therefore, before starting the troubleshooting procedure, do a mechanical check of all the connectors and assemblies to make sure that everything is properly seated.

1. For a complex malfunction, check first for a bad weld, short circuit or loose wire on the solder area of the board
2. Input low level is standard for the TTL logic level below 0.8V.
   Input high level is standard for the TTL logic level above 3.5V.
   But, for PowerPC 603e, the input low level is less than 0.8V, and the input high level is more than 2.0V.
3. USE an oscilloscope or logic analyzer for inspecting the crystal oscillator or its waveform.

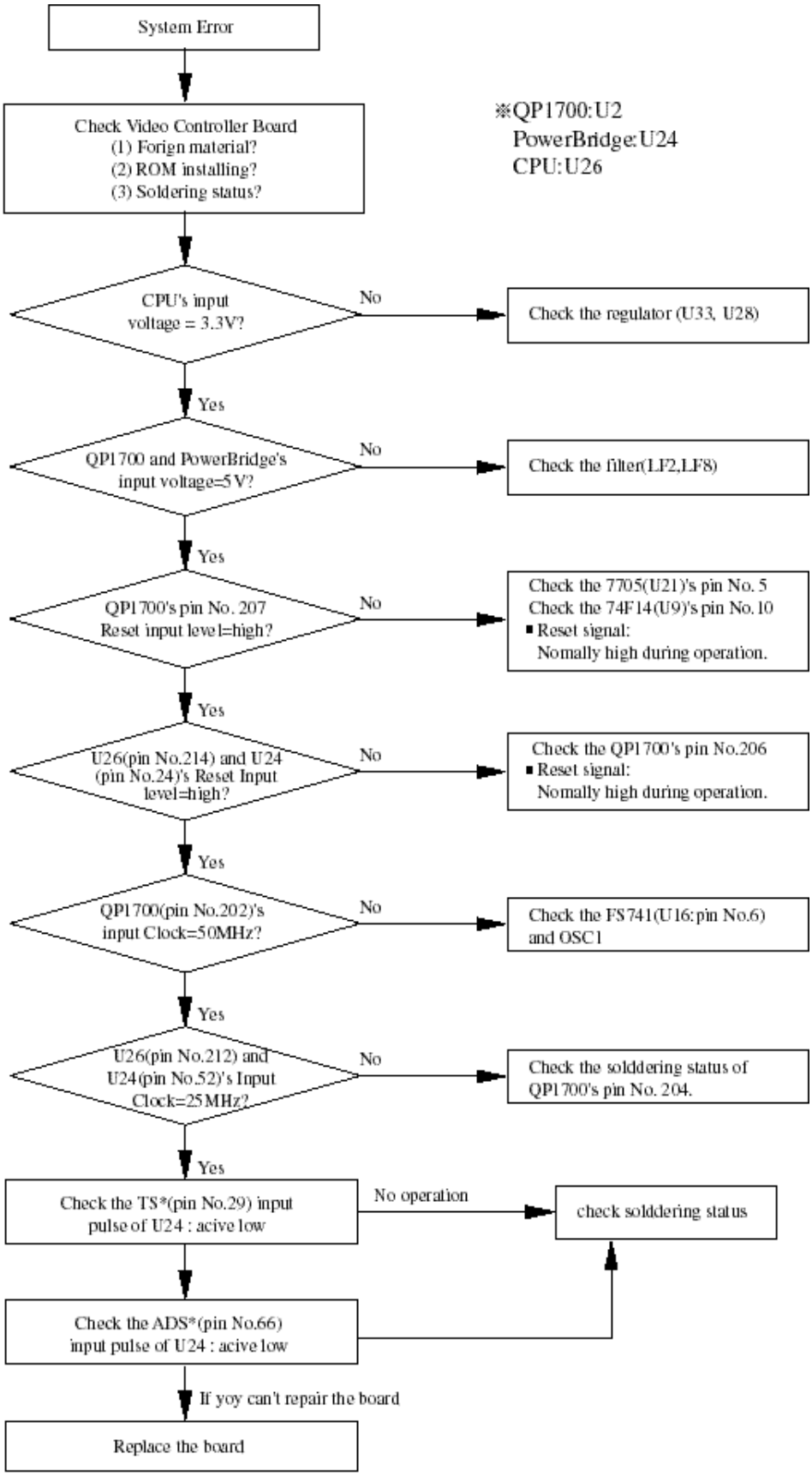
5-5-1. Troubleshooting Flow Chart



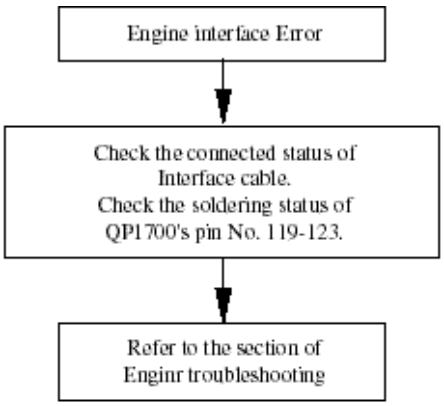
● Power Error


Power Error
Check the connection of Power cord and Cables
Video board's input voltage=5V?
No
Is it short between 5V and GND in the Video board?
No
Yes
Replace the LCD Ass'y board of display panel
Yes
Repair the board
Refer to the No Power sectino of engine troubleshooting

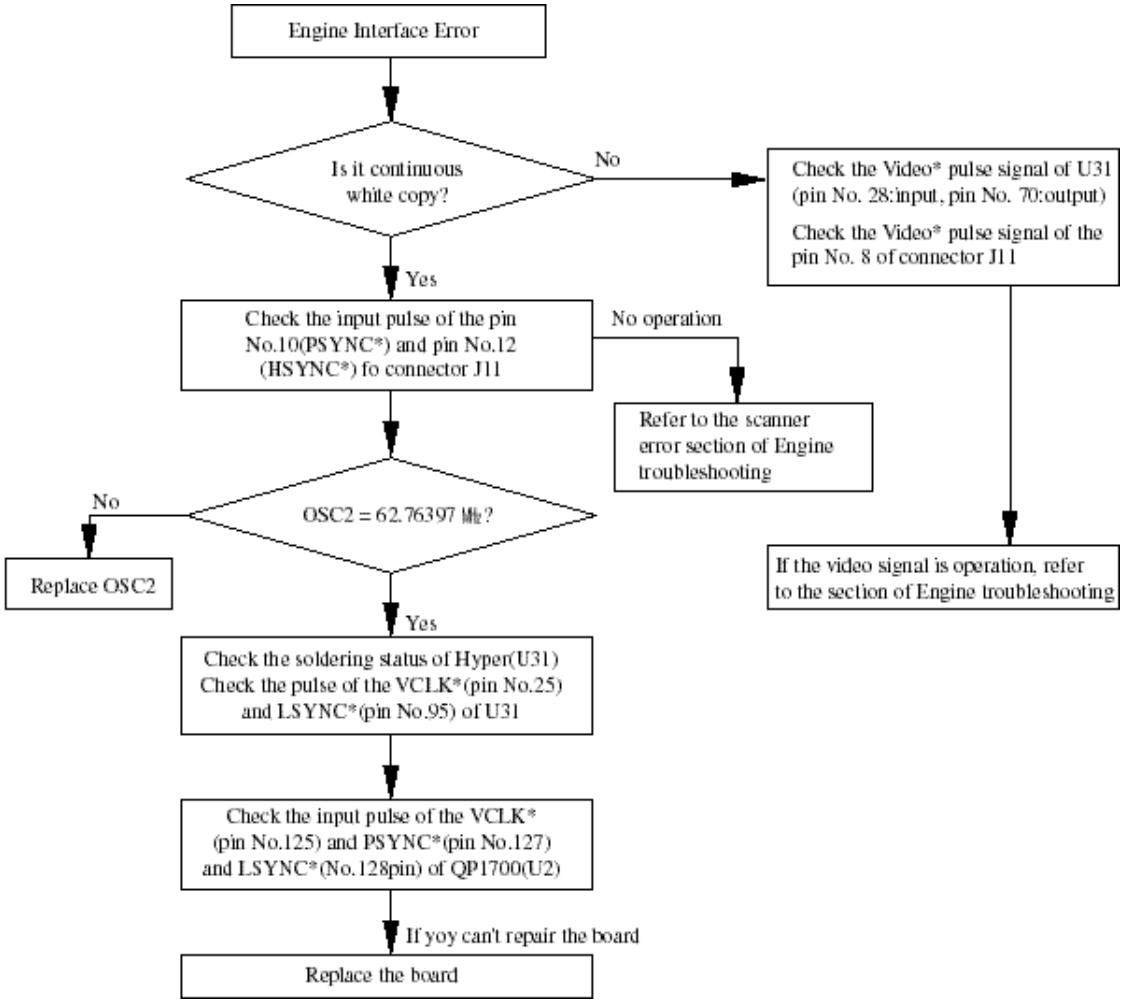
● System Error



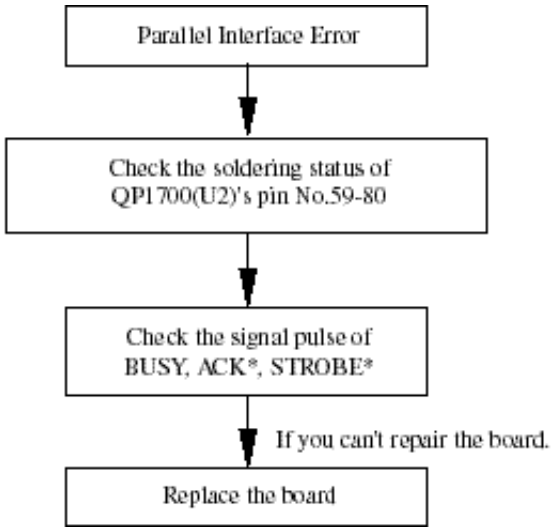
● Engine Error


Engine interface Error
Check the connected status of Interface cable.
Check the soldering status of QP1700's pin No. 119-123.
Refer to the section of Enginr troubleshooting

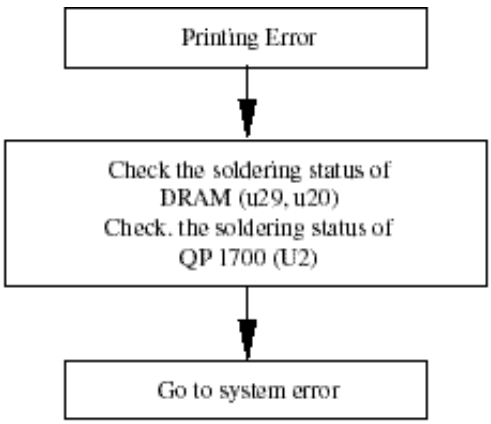
● Self Test Error


Engine Interface Error
Is it continuous white copy?
No
Check the Video* pulse signal of U31 (pin No. 28:input, pin No. 70:output)
Check the Video* pulse signal of the pin No. 8 of connector J11
Yes
Check the input pulse of the pin No.10(PSYNC*) and pin No.12 (HSYNC*) fo connector J11
No operation
Refer to the scanner error section of Engine troubleshooting
No
OSC2 = 62.76397 ㎒?
Replace OSC2
If the video signal is operation, refer to the section of Engine troubleshooting
Yes
Check the soldering status of Hyper(U31)
Check the pulse of the VCLK*(pin No.25) and LSYNC*(pin No.95) of U31
Check the input pulse of the VCLK* (pin No.125) and PSYNC*(pin No.127) and LSYNC*(No.128pin) of QP1700(U2)
If yoy can't repair the board
Replace the board

● Parallel Interface Error


Parallel Interface Error
Check the soldering status of
QP1700(U2)'s pin No.59-80
Check the signal pulse of
BUSY, ACK*, STROBE*
If you can't repair the board.
Replace the board

● Printing Error



5-5-2. Troubleshooting Table of Video Controller Board

NO.	Error Type	Ckeck List	Repair
1	The backlight of LCD is not lit up	Power cord connection	Connect the power cord
		Vcc voltage(nominal is +5V) level Vcc voltage should be in the range between+4.38-+5.2V	Refer to the section of Engine troubleshooting
		Short Between Vcc and GND	Repair board
		Mutual connection of engine, key panel to LCD panel's connected cable(10pin), video board to key panel's connected cable(20pin) and engine interface cable(28pin) The pin of connector is straigh.	Connect the cable to connector
2	It doesn't displayed characters on LCD	Mutual connection of panel cabel(10pin) video board to key panel's connected cable(20pin)	Confirm the connection of connector
		Any component damage on a video controller board.	Repair or replace it with appropriate tools. If uanable to do this, replace video board.
		Any foreign conductive chips of solder or material is on the video controller board or is laid between IC pins after power off.	Remove any foreign conductive chips on the video controller board.
		Reset Error:Reset signal is normal high during operation	
		System source clock is a 50ß ÷ Check point : U16(FS741)'s pin No.6,	Replace the FS741
		The output clock of QP17000 is a 25ß.÷ The input clock of CPU(U26) and U24 is a 25ß.÷	Replace the board
3	White copy	The video data colck source is a 62.7639ß at OSc2 The input clock of U31 is a 62.76397ß.÷ The output clock of U31 is a 16ß.÷ The input clock of U2's pin No.125 is a 16ß.÷	Replace the board
		° Check the normal operation of HSYNC* and PSYNC*	Active low impulse
4	DRAM Error	° Check the DRAM address signals.(pin No. 17-20, 23-28 : U20, U290) ° Check the DRAM data signals. (pin No. 2-5. 7-10. 33-36. 38-41 : U20, U29)	
5	EEPROM	° Check the EEPROM clock signal. (pin No. 2 : U1) ° Check the EEPROM data signals. (pin No. 3,4 : U1)	
6	ROM Error	° Check the ROM chip select signals and read signal (pin No. 12,14) ° CHeck the ROM data signals. (pin No. 15-22, 24-31 : U25, U27, U30, U32)	
7	Engine Error	° Refer to the section of Engine troubleshooting	
8	Parallel Interface Error	° CHeck the operation of printer driver. ° Check the printer cable(bidirectional cable)	Refer to USER's manual Replace the printer cable
9	General descriptions of troubleshooting	° Please refer to the user's manual. ° If you can't fix the trouble of video controller board, replace the video board by the verified board.	Replace the board